SHARP SERVICE MANUAL

S87J7VC-B311N

VHS VIDEO CASSETTE RECORDER

MODEL VC-B311N

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

SPECIFICATIONS

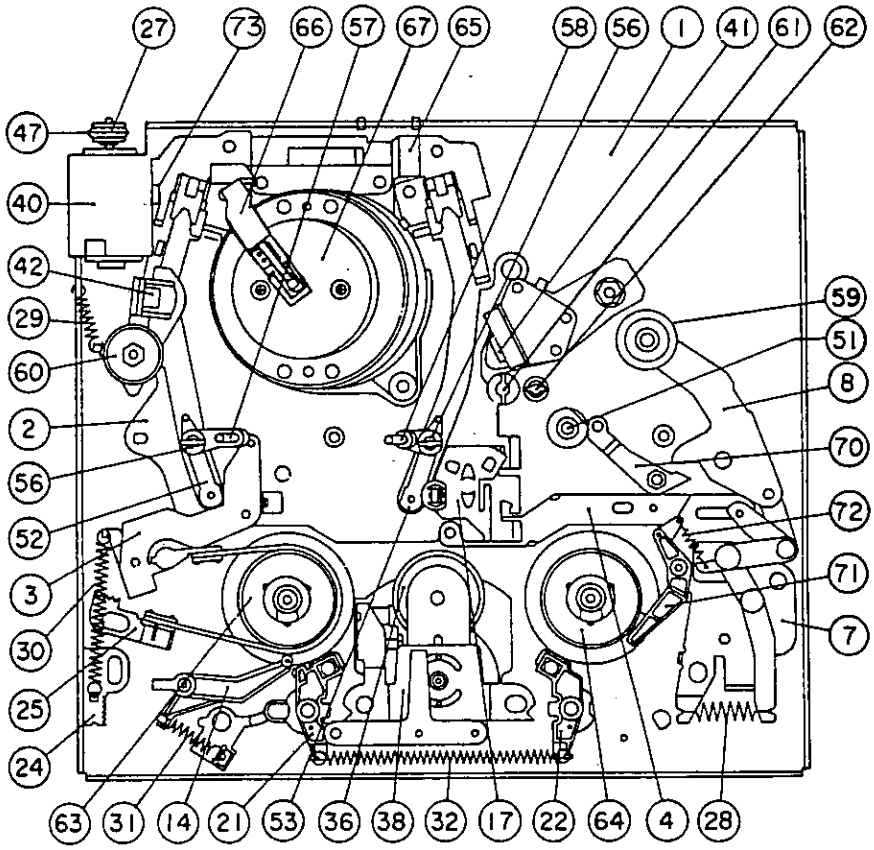
Format:	VHS PAL/SECAM standard
Video recording system:	Two rotary head helical scan system
Video signal:	PAL/SECAM colour and B/W signals, 625 lines
Recording playing time:	4 hours max. with SHARP E-240 tape
Tape width:	12.7 mm
Tape speed:	23.39 mm/sec.
Antenna:	75 ohm unbalanced
Receiving channel:	VHF Channel 2 - 12, UHF Channel 21 - 69
RF converter output signal:	VHF Channel 3 or 4 (Switchable). Preset to 3 Channel
Power requirement:	AC 220V, 50 Hz
Power consumption:	Approx. 30W
Operating temperture:	5°C to 40°C
Storage temperature:	-20°C to 55°C
Weight:	6.5 kg
Dimensions:	430 mm (W) × 351 mm (D) × 93 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
AUDIO	0 dB = 0.775 Vrms
Input:	Line: -8 dB, more than 50k ohm
Output:	Line: -5 dB, less than 1k ohm
Accessories included:	Antenna 75 ohm coaxial connector cable (plug provided) Operation Manual Infrared remote control

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

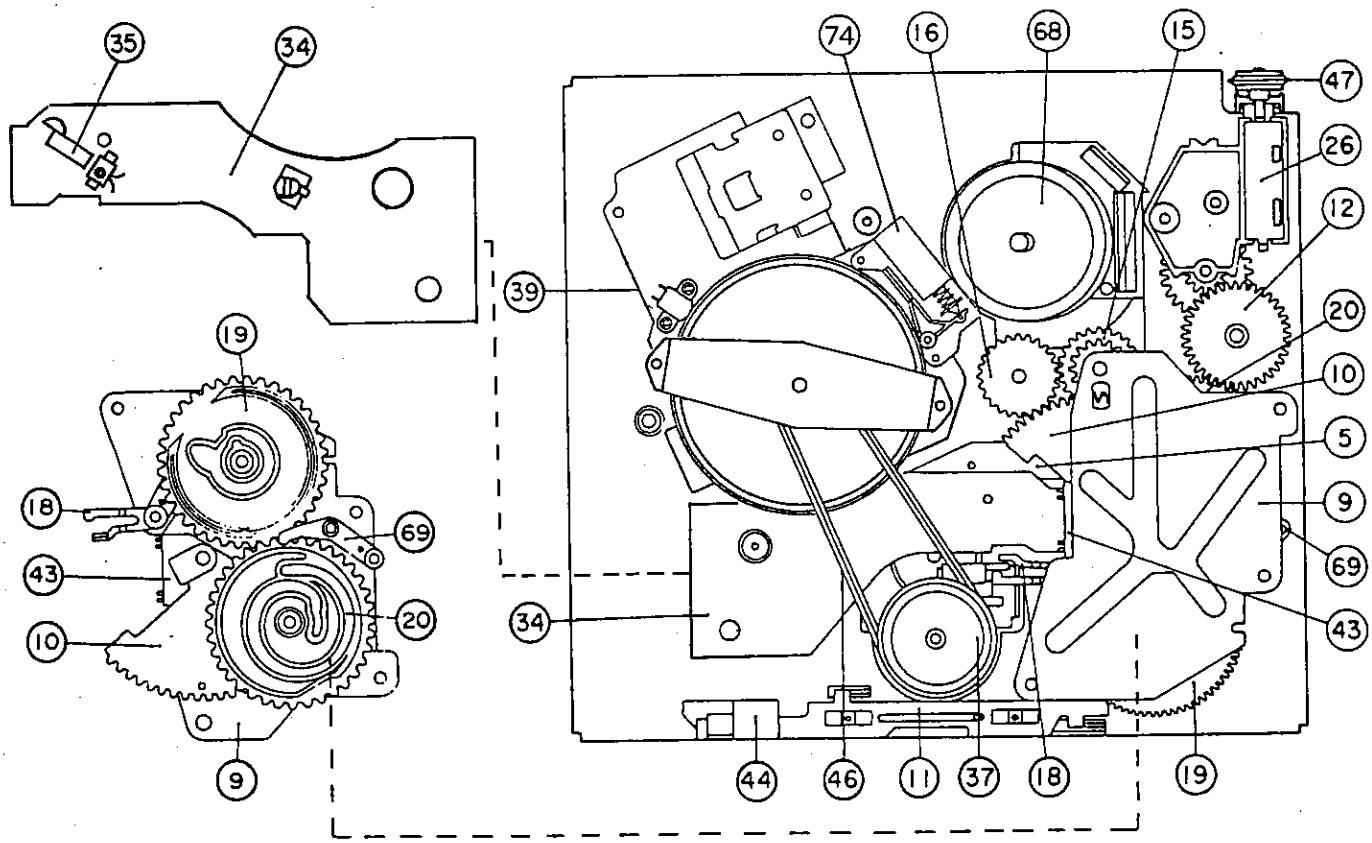
Note: The antenna must correspond to the new standard DIN 45325 (IEC 169-2) for combined UHF/VHF antenna with 75 ohm connector.

LOCATION OF MECHANICAL PARTS

● TOP VIEW



● BOTTOM VIEW



LOCATION LIST OF MECHANICAL PARTS

No.	Part Name	No.	Part Name
1	Main chassis ass'y	38	Reel drive unit bracket
2	Guide plate ass'y	39	Capstan DD motor
3	Tension arm ass'y	40	Loading motor
4	Shifter (B) ass'y	41	Audio/Control head
5	Shifter (A) ass'y	42	Full-erase head
6	————	43	Cam switch
7	Pinch roller link plate ass'y	44	Brake solenoid
8	Pinch roller lever	45	————
9	Mechanism control bracket	46	Reel belt
10	Segment gear ass'y	47	Loading belt
11	Brake drive lever	48	————
12	Relay gear (B)	49	————
13	————	50	————
14	Auxiliary brake lever	51	Capstan shaft
15	Loading gear (A)	52	Pole base (A) (supply side)
16	Loading gear (B)	53	Pole base (B) (take-up side)
17	LED holder	54	————
18	Torque change lever	55	————
19	Brake cam	56	Guide roller (supply side/take-up side)
20	Master cam	57	Supply slant pole
21	Supply brake lever	58	Take-up slant pole
22	Take-up brake lever	59	Pinch roller
23	————	60	Supply impedance roller
24	Tension adjusting plate	61	X-position adjusting nut
25	Tension band ass'y	62	Retaining guide
26	Loading block	63	Supply reel disk
27	Loading motor pulley	64	Take-up reel disk
28	Pinch pressure spring	65	V base
29	Full-erase head arm spring	66	Earth brush
30	Tension arm spring	67	Drum
31	Auxiliary brake spring	68	Drum DD motor
32	Main brake spring	69	Tension release lever
33	————	70	Reverse guide ass'y
34	Reel sensor PWB	71	Universal brake
35	Shifter switch	72	Universal brake spring
36	Reel idler	73	Dew sensor
37	Reel pulley	74	DD brake solenoid

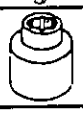
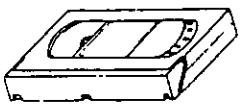
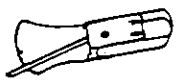
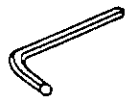
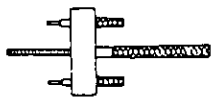
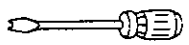
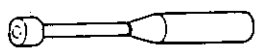
ADJUSTMENT, REPLACEMENT, ASSEMBLING AND TOOLS NECESSARY FOR MECHANICAL ADJUSTMENT

• Outline

Periodical maintenance is necessary for efficient operation. In some instance field service may be achieved with common tools. More extensive service will require special tools and test equipment. Appropriate tools should be used at all times.

TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are recommended for proper service and satisfactory repair.

No.	Jig Item	Part No.	Code	Configuration	Remarks
1	Reel Disk Height Adjusting Jig	JiGRH0002	BR		These Jigs are used for checking and adjusting the Reel Disk Height.
2	Master Plane Jig	JiGMP0001	BY		
3	A/C Head Tilt Adjusting Jig	JiGACH51B	BU		This Jig is used for height adjustment of the running tape to the Video Head.
4	Torque Gauge 90 g	JiGTG0090	CM		These Jigs are used for checking and adjusting the torque of Take-up and Supply Reel disks.
	Torque Gauge 1.2 kg	JiGTG1200	CN		
5	Gauge Head	JiGTH0006	AW		
6	Cassette Torque Gauge	JiGVHT-063	CZ		This cassette torque gauge is used for checking and adjusting torque of take-up and supply reel and for measuring tape back tension.
7	Tension Gauge (300g)	JiGSG0300	BF		There are several Gauges used for the tension measurements, 300 g and 2.0 kg.
	Tension Gauge (2.0 kg)	JiGSG2000	BS		
8	Hex Wrench (0.9 mm)	JiGHW0009	AE		These Jigs are used for loosening or tightening special Hexagon type screws.
	Hex Wrench (1.2 mm)	JiGHW0012	AE		
	Hex Wrench (1.5 mm)	JiGHW0015	AE		
9	Alignment Tape (PAL)	VROCPSV	CK		This tape is especially used for electrical fine adjustment.
10	Drum Replacing Jig	JiGDT-0001 or JiGDT-0001CD	BG AZ		This is used for the replacement of the VCR's upper drum.
11	Tension Gauge Adaptor	JiGADP003	BK		This Jig is used for the tension gauge. Rotary Transformer Clearance Adjusting Jig.
12	Special Bladed Screwdriver	JiGDRIVERH-4	AP		This Screwdriver is used for adjusting the guide roller height.
13	Tension Band and Plate Adjusting Jig	JiGDRIVER-6	BM		This Jig is used for adjusting tension band and tension plate adjust.
14	Torque Driver	JiGTD1200	CB		This Jig is used for fixing measurement, 12 kg.
15	AC Head Height Adjusting Box Driver	JiGDRIVER110-7	AS		This Jig is used for height adjustment of the A/C head.

NOTE:
Current JiGMA0001 contains master plane (JiGMP0001) and Disk Height Adjusting Jig (JiGRH0001). Even though new Disk Height Adjusting Jig (JiGRH0002) covers wider height, this new Jig (JiGRH0002) can be used for current JiGRH0001, however current Jig (JiGRH0001) cannot be used as JiGRH0002. Master plane (JiGMP0001) can be used with JiGRH0001, and also JiGRH0002.

* * * * * * * *

MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts \ Maintained every	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	3000 hrs.	Remarks
Guide roller ass'y	□	□	□	□	□	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller	□	□	□	□	□	
Supply impedance roller (inner)		□		□	□	Clean with pure high quality isopropyl alcohol.
Supply impedance roller flange B	□	□	□	□	□	Clean tape contact area with the specified cleaning liquid.
Retaining guide	□	□	□	□	□	
Guide flange B	□	□	□	□	□	
Slant pole	□	□	□	□	□	
Video head	□	○ □	□	○ □	○ □	Clean tape contact area with the specified cleaning liquid.
Full-erase head	□	□	□	□	□	
A/C head	□	□	□	□	□	
Capstan belt		□		○		Clean rubber and rubber contact area with the specified cleaning liquid.
Pinch roller	□	□	□	□	○ □	
Reel belt		□		○		
Loading belt		□		○		
Capstan motor					○	
Loading motor					○	
Supply/take-up reel disk		□ △		□ △		Clean with pure high quality isopropyl alcohol.
Tension band ass'y					○	
Reel drive unit					○	
Reel idler	□	□	□	□	□	
Reel pulley	□	□	□	□	□	
Supply/take-up brake lever				○		

NOTE: ○: Part replacement.
□: Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).
△: Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000 hrs).

This model has no adjusting volumes for torques, tension, etc. If the reading is outside the specified range, clean or replace the part.

REMOVAL ADJUSTMENT AND REPLACEMENT OF CASSETTE HOUSING CONTROL ASSEMBLY

Notes:

1. During removal and installation be careful not to strike the nearby guide pin, drum, etc.
2. Before removal or installation, be sure to unplug the recorder from the AC outlet.

- **Removal**

1. Put the unit in the cassette ejected position.
2. Disconnect the connector at the right side of the cassette housing control assembly (Be careful not to break the leads.)
3. Remove the two cassette housing installation screws.
4. Move the cassette housing control assembly (Fig. 1-1) in the direction of arrow ⇒ Ⓑ, and pull it out straight upward.

- **Assembly**

1. Connect the connector at the right side of the cassette housing control assembly.
2. Insert the tabs of the cassette housing control assembly into mechanism chassis, move it in the direction of arrow ⇒ Ⓐ, and secure temporarily. Check to be sure that the cassette housing control assembly is in the correct position, and then tighten the two screws (XHPS330P06WS0).
3. Correctly place the lead wiring of the connector at the right side of the cassette housing control assembly.

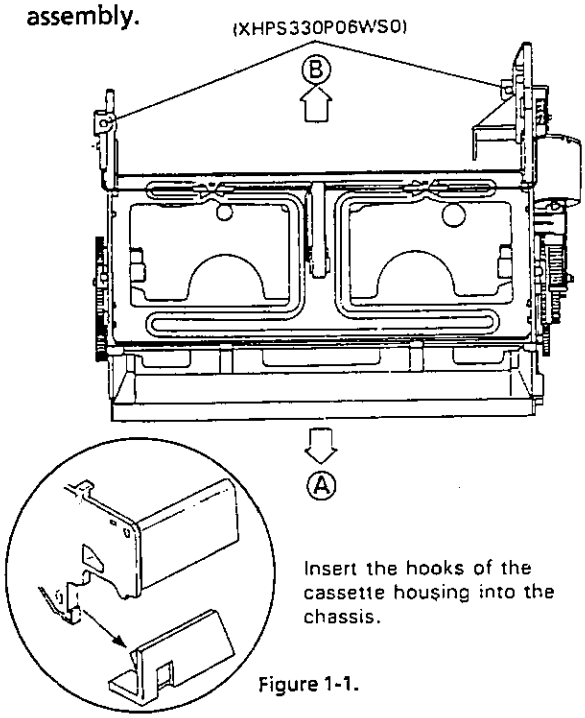


Figure 1-1.

DISASSEMBLY AND REASSEMBLY OF WORM WHEEL ASSEMBLY

- **Disassembly (Fig. 1-2)**

1. Remove the lead connector ① from the cassette relay PWB.
2. Loosen the two tabs Ⓐ at the cassette relay PWB and remove the cassette relay PWB from the frame.
3. Remove the screw ② from the cassette motor bracket and detach the cassette motor assembly together with the cassette relay PWB from the cassette housing frame.
4. Withdraw the worm wheel assembly ③.

- **Reassembly (Fig. 1-2)**

1. Move the cassette slider assembly towards the cassette lid.
2. Turn the phase gear ⑤ clockwise until it stops.
3. After setting up the worm wheel assembly, fit the alignment mark Ⓒ of the worm wheel assembly to the alignment mark Ⓑ of the phase gear. Then insert them into the frame shaft: this time, check that the tab Ⓓ of the cassette slider assembly is engaged with the drive arm groove.
   The worm wheel is likely to fall off the frame shaft in this step: be sure to hold the worm wheel by hand.
4. Align the tab Ⓔ of the timing lever with the worm wheel groove Ⓖ and secure the worm wheel assembly with the screw ②.
5. Align the tab Ⓕ of the timing lever with the groove Ⓗ of the cassette mode switch ⑥, and secure the cassette relay PWB with the frame's tab Ⓐ : this time, check that the two tabs ① of the cassette mode switch are surely engaged with the cassette motor bracket groove Ⓙ.
6. Insert the lead connector into the socket of the cassette relay PWB.

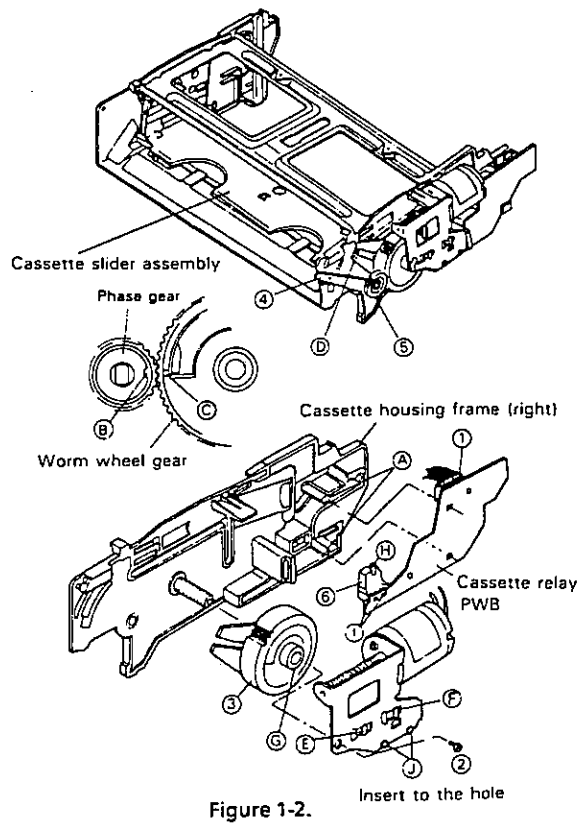


Figure 1-2.

- Set up of worm wheel assembly (Fig. 1-3)

1. Put the tab Ⓐ of the drive arm ① into the hole Ⓑ of the drive gear ②.
2. Hook both ends of the drive spring ③ onto the tab Ⓐ of the drive arm and tab Ⓒ of the drive gear respectively.
3. Hook one end Ⓔ of the drive reciprocating spring ④ onto the tab Ⓓ of the drive gear assembly and mount another end Ⓕ of the drive reciprocating spring onto the tab Ⓖ of the drive gear; this time, hold the end Ⓕ of the drive reciprocating spring by hand.
4. Fit the tab of the worm wheel gear Ⓘ onto the tab Ⓖ of the drive gear.
5. Using a tapered screwdriver, hook the end Ⓕ of the drive reciprocating spring onto the tab Ⓙ of the worm wheel gear; check that both ends of the drive reciprocating spring have been engaged with the respective tabs of the drive gear assembly.
6. Holding the drive gear by hand, turn the worm wheel gear by the other hand counterclockwise. Then the tab Ⓒ of the drive gear will be engaged with the hole Ⓘ of the worm wheel gear Ⓘ.
   (The worm wheel gear doesn't tend to rotate reversely but it is likely to slip out of the shaft Ⓗ of the drive gear. To avoid this, hold both the drive gear and worm wheel gear by hand.)

4. After the above procedures, check that the tab ⓐ of the cassette slider assembly is engaged with the portion Ⓔ of the drive arm (left) ⑦.

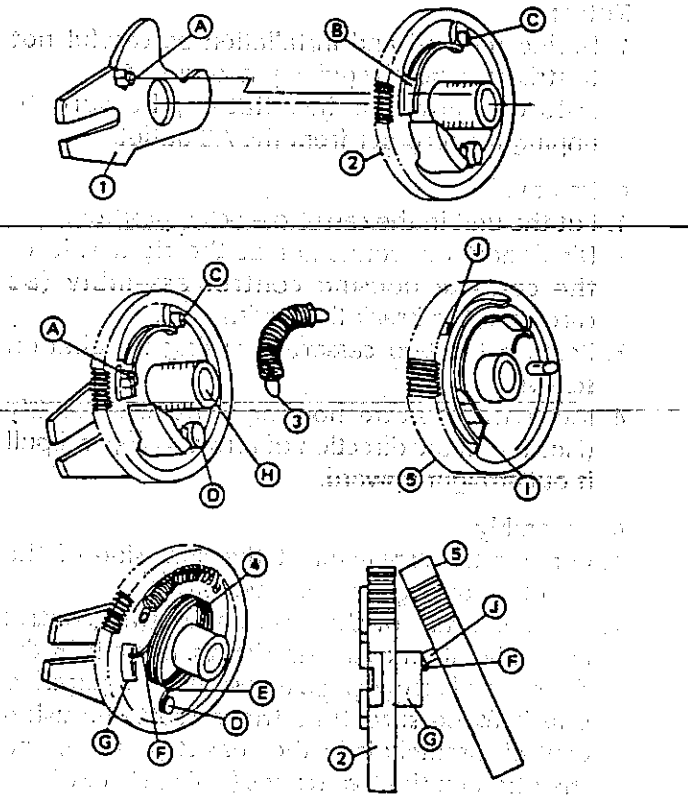


Figure 1-3.

REPLACEMENT OF LOCK RELEASE LEVER

- **Disassembly (Fig. 1-4)**

1. Turn the worm gear ① by hand counterclockwise until the cassette slider assembly ② reaches the bottom position.
2. Slightly extend the right and left frames ③ to allow the tabs Ⓐ of the cassette slider assembly ② to go out of the holes of the right and left frames.
3. Pushing the tabs Ⓑ of the slider holder (right) ④, pull the slider holder (right) out of the cassette slider ⑤.
4. Remove the lock release lever ⑥ from the slider holder (right).

- **Reassembly (Fig. 1-4)**

1. Put the lock release lever ⑥ to the slider holder (right) ④ : check that the tab Ⓒ of the slider holder (right) is surely engaged with the hole Ⓓ of the lock release lever.
2. Move the lock release lever so that it is positioned inside the tab of the cassette slider ⑤.
3. Extend the right and left frames and let the right and left tabs Ⓐ of the cassette slider assembly be engaged with the grooves of the right and left frames.
   For easy insertion, set the drive arm (left) ⑦ at 5 mm away from its bottom by turning the worm gear clockwise, first.

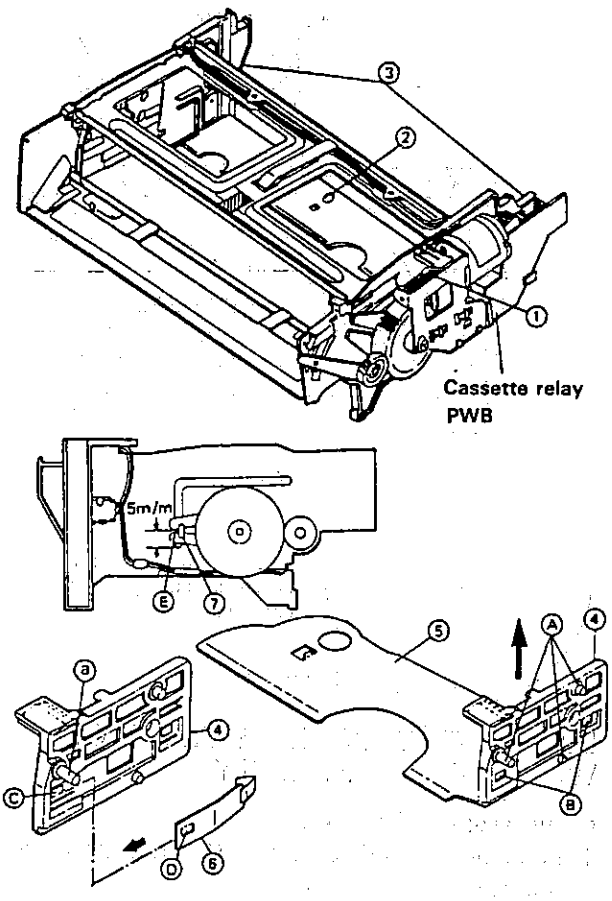


Figure 1-4.

TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Open the lid of a cassette tape by hand and hold it with a piece of vinyl tape.
2. Set the cassette tape in the tape mechanism. Then, stabilize the cassette tape with a weight (500 g or less).
   Note: The weight should not be more than 500 g.

REMOVAL AND HEIGHT ADJUSTMENT OF REEL DISKS

- **Removal of supply reel disk:**

1. Remove the tension band ⑥ and tension arm ②.
2. Remove the split washer ①.
3. Pull the supply reel disk ③ upwards, and replace.

* At this time, remove the height adjusting washer ⑤ and clean it.

- **Removal of take-up reel disk:**

1. Remove the split washer ①.
2. Pull the take-up reel disk ④ upwards, and replace.

* At this time, remove the height adjusting washer ⑤ and clean it.

Notes:

1. After replacing either of the reel disks, be sure to perform the height adjustment procedure.
2. Take care not to damage the tension band.
3. Be careful not to deform the auxiliary brake lever, supply brake lever, take-up brake lever and universal brake lever. (See page 3; item 14, 21, 22 and 71.)
4. Check the tension pole position. (See pages 11 and 12.)

- **Replacement of supply reel disk:**

1. Clean the reel disk shaft, and set the height adjusting washer ⑤.
2. Place the new supply reel disk onto the shaft.
3. Adjust the reel disk height by using the master plane and reel disk height adjusting jig.
4. Take the new supply reel disk off, apply oil (high quality spindle oil) to the reel disk shaft and again place the disk onto the shaft.
5. Replace the split washer ①.
6. Replace the tension arm ② and tension band ⑥.

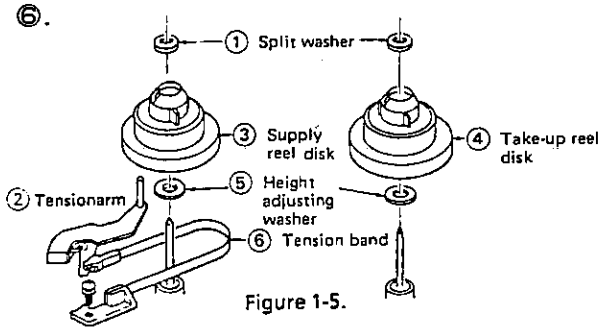


Figure 1-5.

- **Replacement take-up reel disk:**

1. Clean the disk shaft, and set the height adjusting washer ⑤.
2. Place the new take-up reel disk onto the shaft.
3. Adjust the reel disk height by using the master plane and reel disk height adjusting jig.
4. Take the new reel disk off, apply oil (high quality spindle oil) to the reel disk shaft and again place the disk onto the shaft.
5. Replace the split washer ①.

Notes:

1. Take care not to damage the reel disk shaft's surface with the tools.
2. After replacement, check back the tension in video search (VS) mode (see page 11) and checking of brake torque. (See page 13.)

HEIGHT ADJUSTMENT

1. Remove the cassette housing, and place the master plane onto the mechanism unit as shown in Fig. 1-6(a), taking care not to hit the drum.
2. Insure that the reel disk is lower than the part Ⓐ but higher than the part Ⓑ of Fig. 1-6(b), by using the reel disk height adjusting jig. If the height is not correct use the height adjusting washers. Backlash on the shaft should be 0.1 to 0.8 mm.

Note: Whenever replacing the reel disk, perform the height adjustment.

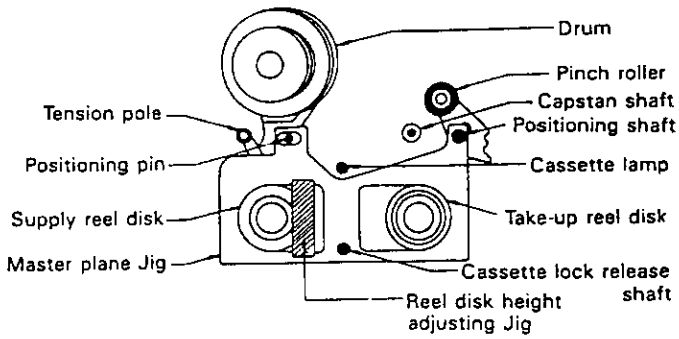


Figure 1-6.(a) top view

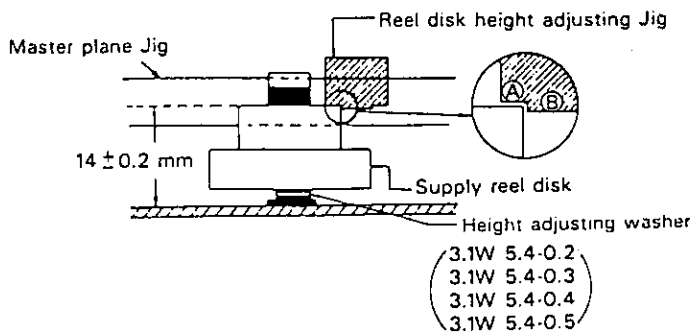


Figure 1-6.(b) side view

ADJUSTMENT OF FAST FORWARD TORQUE

Notes:
1. The torque gauge is liable to slip off the reel disk when rotation starts.
2. Perform this check without the use of a cassette tape.

- **Checking (See Fig. 1-7)**

1. Remove the cassette housing.
2. Set the torque gauge on the take-up reel disk and push the fast forward button.
3. Turn the torque gauge very slowly by hand (one rotation every 2 to 3 seconds) and check that it indicates a little more than 600 g.cm. Check that there is no slippage between the reel idler and relay idler or take-up reel disk.

- **Adjustment**

If the fast forward torque is less than 600 g.cm, use isopropyl alcohol to clean the relay idler, reel idler and take-up reel disk, then recheck the torque. If fast forward torque is still less than 600 g.cm, replace the reel belt.

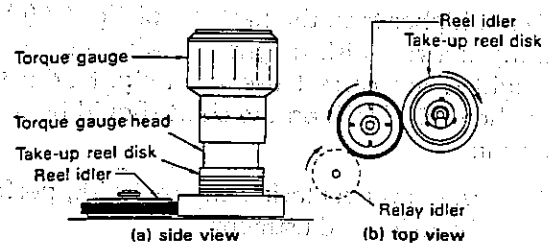


Figure 1-7.

ADJUSTMENT OF REWIND TORQUE

Notes:
1. The torque gauge is liable to slip off the reel disk when rotation starts.
2. Do not lock the reel disk, and avoid making this measurement for an extended period.

- **Checking (See Fig. 1-8)**

1. Remove the cassette housing.
2. Set the torque gauge on the supply reel disk and push the rewind button.
3. Turn the torque gauge very slowly by hand (one rotation every 2 to 3 seconds) until it indicates a little more than 600 g.cm. Check that there is no slippage between the reel idler and relay idler or supply reel disk.

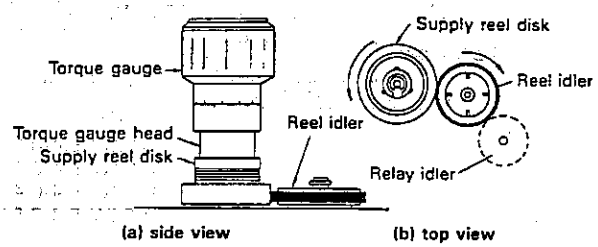


Figure 1-8.

- **Adjustment**

If the rewind torque is less than 600 g.cm, use isopropyl alcohol to clean the relay idler, reel idler and supply reel disk, then recheck the torque. If rewind torque is still less than 600 g.cm, replace the reel belt.

ADJUSTMENT OF PLAYBACK TORQUE

- **Checking**

1. Remove the cassette housing.
2. Place a torque meter cassette in the mechanism and set the mechanism to the record mode. Check that the torque is within the specified range.

   Torque in mode: 110 ± 40 g.cm

   Note:
   The measured torque fluctuates due to the rotational deviation of the reel drive unit. Use the center of the fluctuating range as the measured value.
3. If the torque is outside the specified range, clean the reel idler, take-up reel disk, and relay idler with isopropyl alcohol. Then recheck the torque.
4. Check that the torque in the record mode is within the specified ranges.
5. If the playback torque is still outside the specified range, replace the reel drive unit.

CHECKING THE FAST FORWARD BACK TENSION

Note:
Set the torque gauge securely on the supply reel disk; if the torque gauge is loose above the reel disk an inaccurate measurement will result.

- **Checking**

1. Remove the cassette housing.
2. Push the fast forward button to place the unit in the fast forward mode.
3. Place the torque gauge on the supply reel disk, turn it clockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within 37 ± 5 g.cm.

CHECKING THE REWIND BACK TENSION

Note:
Set the torque gauge securely on the reel disk: if the torque gauge is loose above the reel disk an inaccurate measurement will result.

- **Checking**

1. Remove the cassette housing.
2. Push the rewind button to place the unit in the rewind mode.
3. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within 20 ± 5 g.cm.

CHECKING THE VIDEO SEARCH BACK TENSION

Note:
Set the torque gauge securely on the take-up reel disk; if the torque gauge is loose above the reel disk an inaccurate measurement will result.

- **Checking**

1. Remove the cassette housing.
2. Push the play button to place the unit in the playback mode.
3. Push the video search forward button to place the unit in the video search rewind mode.
4. Place the torque gauge on the take-up reel disk, turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is between 40 ± 8 g.cm.

CHECKING THE PINCH ROLLER PRESSURE

1. Remove the cassette housing.
2. Push the play button to place the unit in the playback mode.
3. Hook the tension gauge adapter around the pinch roller shaft.
4. Using a tension gauge, pull the pinch roller in the direction of arrow → Ⓐ so that the pinch roller moves away from the capstan shaft.
5. Gradually release the pressure in the direction of arrow → Ⓑ to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
6. Check that the reading of the tension gauge is in the range of 1000 to 1200 gr.

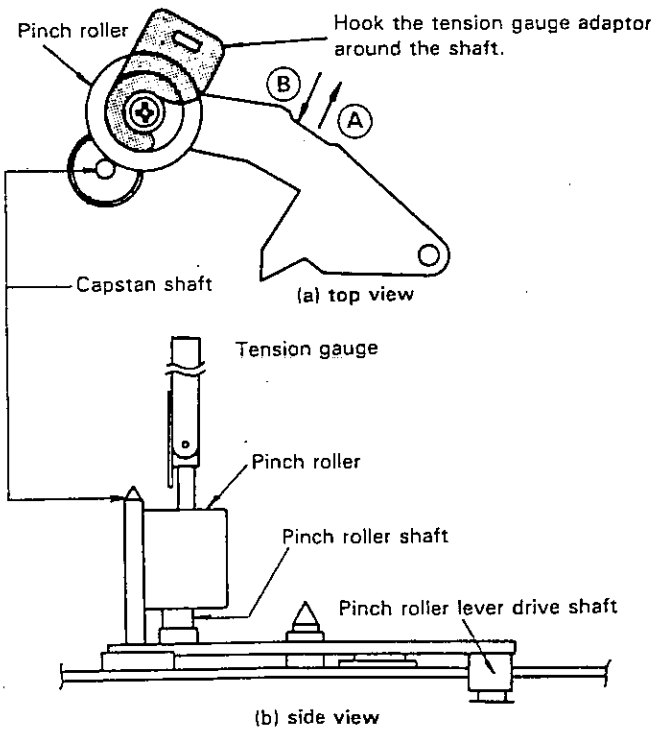
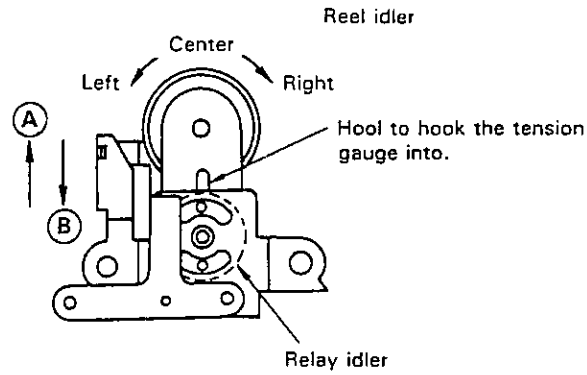


Figure 1-9.

CHECKING THE REEL IDLER PRESSURE

1. Remove the cassette housing.
2. Place the reel idler in its center position as shown in Fig. 1-10.
3. Using a tension gauge, push the reel idler in the direction of arrow → Ⓐ so that the reel idler moves away from the relay idler.
4. Release the pressure gradually in the direction of arrow → Ⓑ, so that the reel idler touches the relay idler again. Check that the reading of the tension gauge is within 105 to 145 g.cm.



How to use tension gauge

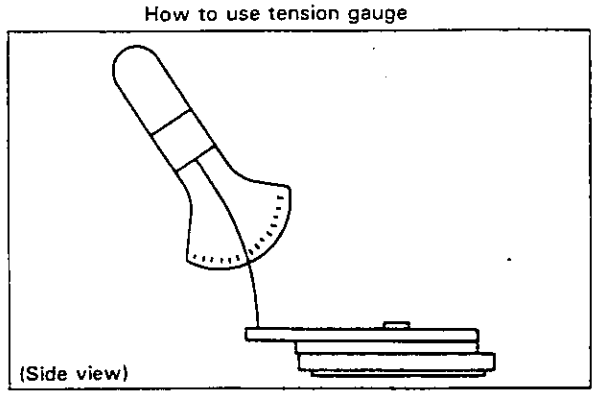


Figure 1-10.

ADJUSTMENT OF TENSION POLE

- **Position checking (Fig. 1-11)**

1. Remove the cassette housing.
2. Load a video cassette tape and push the record button to place the unit in the recording mode.
3. The pole bases A and B (see page 3; item 52 and 53.) operate to bring the tape outside the cassette housing and simultaneously the tension pole moves to the left, loading the tape. At that time (loading mode), check the position of the tension pole.
4. At the end of the tape (E-180), check that the tension pole's center is 0.6 to 1.0 mm to the right of the supply impedance roller's center.
5. Check that the tape is neither curled against the flange of the supply impedance roller nor mounted over it.
6. During the video search REW mode, check that the supply reel disk is free of the tension band.

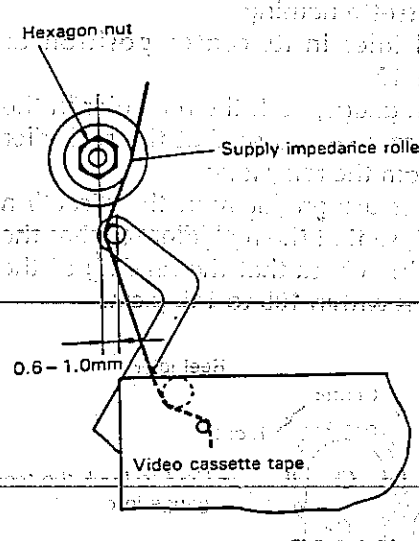


Figure 1-11.

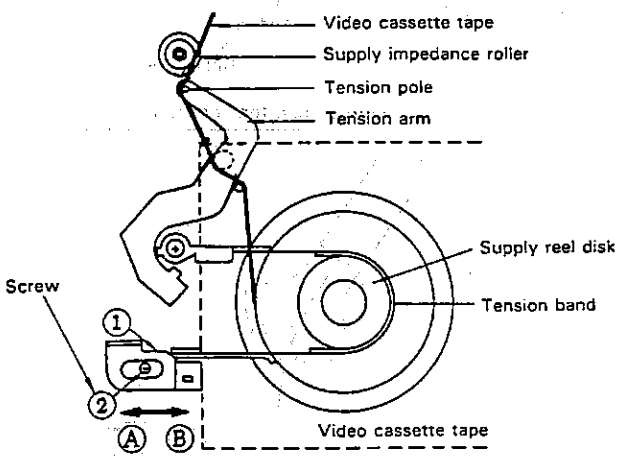


Figure 1-12.

- **Position adjustment (Fig. 1-12)**

1. If the tension pole is more than 1.0 mm to the right of the supply impedance roller's center, shift the tension band control bracket ① in the direction of arrow → Ⓑ, and tighten the screw ②.
2. If the tension pole is less than 0.6 mm to the right of the supply impedance roller's center, shift the tension band control bracket ① in the direction of arrow → Ⓐ, and tighten the screw ②

Notes:

1. After the adjustment, apply glyptal on the screw.
2. If the screw is tightened beyond its limit (5kg. cm), its effect becomes nil (be careful not to over tighten). Use the specified torque drive (JIGTD1200).

ADJUSTMENT OF RECORD/PLAYBACK BACK TENSION

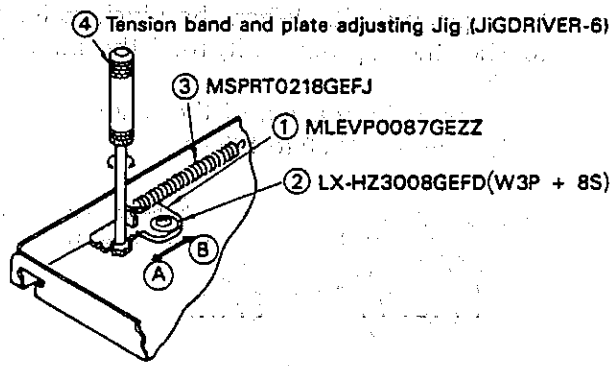
(1) When using a torque meter cassette.

- **Checking**

1. Remove the cassette housing.
2. Put a back tension torque meter cassette tape into the unit.
3. Push the record button to place the unit in the record mode. Check that the reading of the cassette tape's pointer is 50 to 58 g.cm.
4. Make sure the video cassette tape is wound over the retaining guide.
5. Make sure that the tape is not slack nor damaged at either end.

- **Adjustment**

1. If the tape tension is less than the specified value move the tension adjust plate by tension band and plate adjusting jig ④ in the direction of arrow → Ⓐ in Fig. 1-13, and tighten the screw ②.
2. If the tape tension exceeds the specified value move the tension adjust plate by tension band and plate adjusting jig ④ in the direction of arrow → Ⓑ in Fig. 1-13, and tighten the screw ②.



{ Toward Ⓐ if lower than specified value
Toward Ⓑ if higher than specified value

Figure 1-13.

Note:

Be careful not to tighten the screw too much, because to do so will damage the screw threads of the chassis. Be sure to use the specified jig (JiGDRIVER-6).

CHECKING THE BRAKE TORQUE

A) Checking the brake torque at the supply side.

- **Checking**

1. Remove the cassette housing assembly.
2. Check that the mechanism is in the stop mode.
3. Separate the reel idler from the supply reel disk and place the torque gauge on the supply reel disk.
4. Slowly rotate the torque gauge in the clockwise (CW) direction so that the reel disk and the gauge needle rotate at the same speed. Repeat for the counterclockwise (CCW) direction of the supply brake. Check that the values are within the specified ranges (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm) and that the brake torque in the CW direction is at least twice as high as the brake torque in the CCW direction at the take-up reel disk.

- **Adjustment**

1. If the supply brake torque is outside the specified ranges (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm), clean the supply reel disk, and then recheck.
2. If the supply brake torque is still outside the specified range, replace the main brake spring, and then recheck.

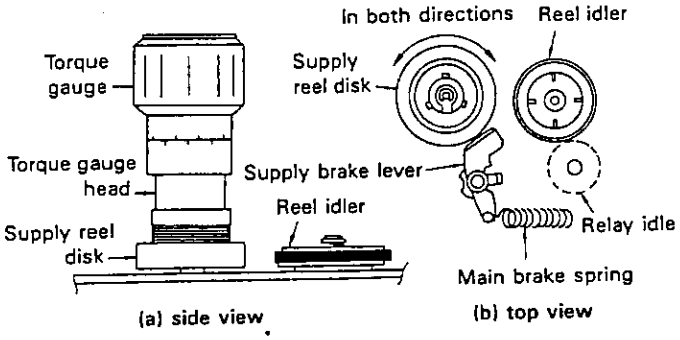


Figure 1-14.

B) Checking the brake torque at the take-up side.

- **Checking**

1. Remove the cassette housing assembly.
2. Check that the mechanism is in the stop mode.
3. Separate the reel idler from the take-up reel disk and place the torque gauge on the take-up reel disk.
4. Slowly rotate the torque gauge in the CW direction so that the reel disk and the gauge needle rotate at the same speed. Repeat for the CCW direction of the take-up brake. Check that the values are within the specified ranges (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm) and that the brake torque in the CW direction is at least twice as high as the brake torque in the CCW direction at the supply reel disk.

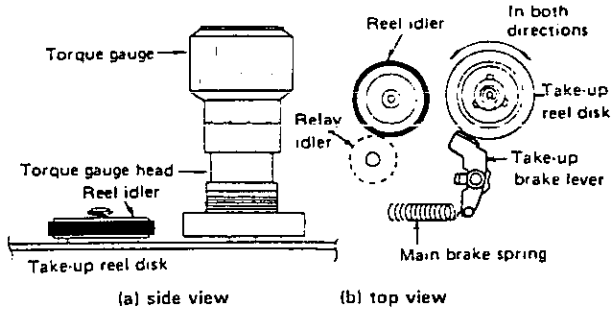


Figure 1-15.

- **Adjustment**

1. If the take-up brake torque is outside the specified ranges (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm), clean the take-up reel disk, and then recheck.
2. If the take-up brake torque is still outside the specified range, replace the main brake spring, and then recheck.

REPLACEMENT OF A/C (Audio Control) HEAD

Note:

After replacement, check for smooth tape movement. Under all circumstances avoid touching the head (indicated by "→" in Fig. 1-18(c)).

- **Replacement (See Figs. 1-16 and 1-17)**

1. Unsolder the leads attached to the A/C head PWB and remove them from the PWB.
2. Loosen the tilt adjusting screw ② by using a phillips screwdriver.
3. Remove the azimuth adjusting screw ⑤ (3P + 8S) with a phillips screwdriver.
4. Remove the A/C head screw ④ with a phillips screwdriver, paying attention to the spring ⑦ between the A/C head screw ④ and A/C head assembly ①.
5. Remove the connector soldered to the A/C head PWB, and solder the connector onto the new A/C head PWB.
6. The A/C head assembly ① is attached so that the A/C head arm and A/C head plate stand are roughly parallel to one another.
7. Set the A/C head tilt according to Fig. 1-19.
8. Play an alignment tape and roughly adjust the height of the A/C head, by eye, by turning the A/C head adjusting hexagon nut with the special nut driver until the tape comes to the position shown below. (See Fig. 1-16.)

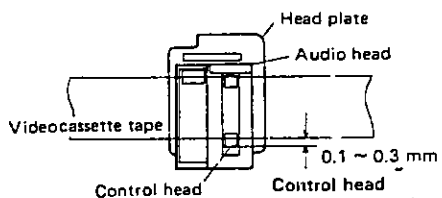
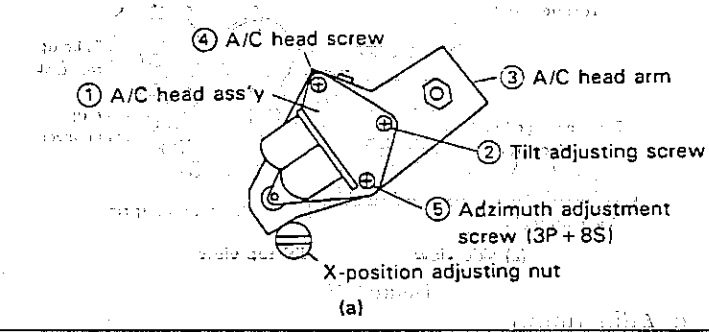
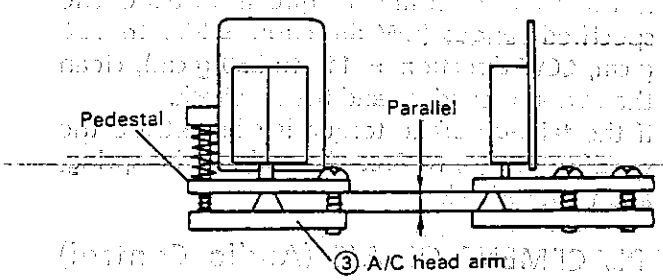

Head plate
Audio head
Videocassette tape
0.1 ~ 0.3 mm
Control head
Control head
Adjust by visual sighting until the control head is about 0.1 to 0.3 mm below the bottom of the tape

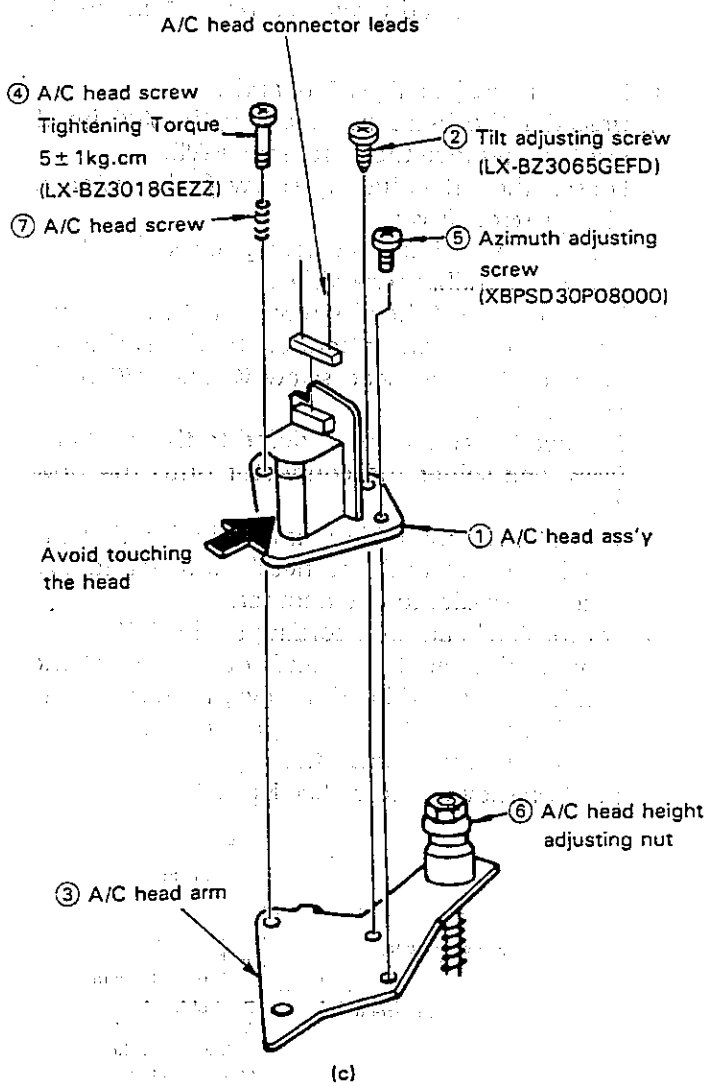
Figure 1-16.


④ A/C head screw
① A/C head ass'y
③ A/C head arm
② Tilt adjusting screw
⑤ Adzimuth adjustment screw (3P + 8S)
X-position adjusting nut

(a)



(b)



(c)

Figure 1-17.

9. Set the mechanism to the unloading mode. Place the A/C head tilt adjusting jig on the main chassis as shown in Figs. 1-19 and 1-20. Slowly turn the set screw with a hex wrench (1.5 mm JIGHW0015) until there is no gap between the jig and the A/C head.

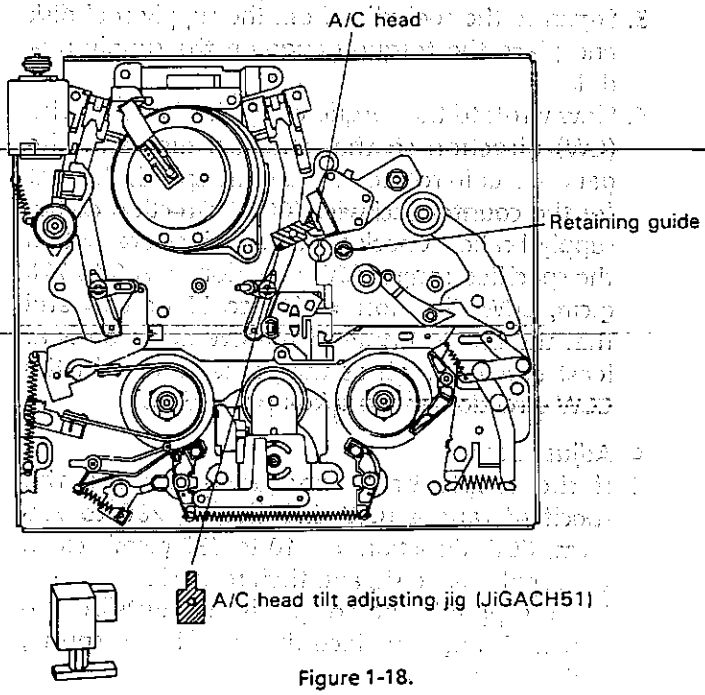


Figure 1-18.

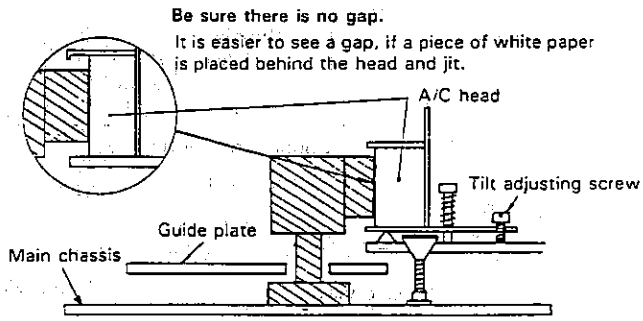

Be sure there is no gap.
It is easier to see a gap, if a piece of white paper is placed behind the head and jit.
A/C head
Tilt adjusting screw
Guide plate
Main chassis

Figure 1-19.

10. When A/C head replacement has been completed, adjust the tape drive train.

ADJUSTMENT OF TAPE DRIVE TRAIN

This includes rough adjustment using an alignment tape and adjustment of retaining guide height, reverse guide height, A/C head height, azimuth, and X-position of guide roller.

- **Remove the cassette housing**

1. Check and adjust the lateral and vertical position of the tension pole and the back tension.

2. Set the angle of tilt for the A/C head as shown in Fig. 1-19.
   Note:
   The angle of tilt must be adjusted in the same manner as when the head was replaced, even when the A/C head is adjusted.
3. When the above adjustments have been completed, roughly adjust the tape drive train using an alignment tape.
   a. Connect the oscilloscope to the test points for PB chroma output (TP201), head switching pulse (TP202), and GND (TP203). Allow the PB CHROMA signal to be triggered by the head switching pulse of TP202 (See Fig. 2-10).
   b. Loosen the setscrew of the guide roller, and tighten it loosely by using a guide roller adjusting screwdriver (JiGDRiVERH-4) to such an extent so that the guide roller turns smoothly.
   c. Set the alignment tape (VROCPSV) on the reel disk.
      Note:
      Attach a 400 to 650 g. weight to the cassette tape when a cassette tape is placed on the reel disk with the cassette housing removed.
   d. Set the unit to the playback mode.
   e. Observe the waveforms of the PB chroma, and adjust the tracking knob for a flat PB chroma.

This adjustment is satisfactory if a flat response is obtained on the RF output when the tracking knob is rotated. If a flat response cannot be obtained, roughly adjust the guide roller using an alignment tape until the PB chroma output is flat. Adjust the X-position adjusting nut so that the PB CHROMA envelope becomes almost maximum in the tracking center. In the case of rough adjustment, pay particular attention to the outlet side (See Fig. 1-20).

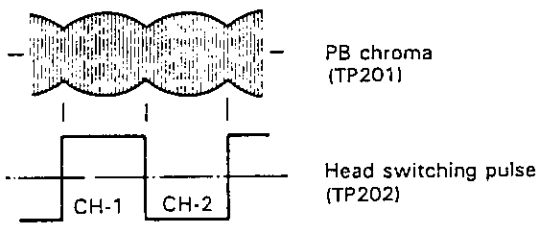


Figure 1-20.

4. The A/C head height and azimuth are adjusted after the roughly adjust the tape drive has been set.
   a. Use the alignment tape to playback its audio 7kHz signal (staircase-like waveform for video signal) and observe the audio output on an oscilloscope.
   b. Adjust the azimuth adjusting screw ⑤ (3P + 8S) so as to obtain maximum audio output.
   c. Slowly rotate the A/C head height adjusting nut ③ with the special box driver so as to obtain the maximum audio output level.
   d. Adjust the azimuth adjusting screw ⑤ (3P + 8S) so as to obtain maximum audio output level.
      After this adjustment, apply glytal to the screws and nuts.
5. The final adjustments of tape drive train and X-position are adjusted after adjustment of the A/C head has been completed.
   a. Connect the oscilloscope to the test points for PB chroma output (TP201), head switching pulse (TP-203), and GND (TP203). Allow the PB CHROMA signal to be triggered by the head switching pulse of TP202.
   b. Play the tape drive train alignment tape (VROCPSV).
   c. Finely adjust the guide roller's height so that the envelope is as flat as possible.
      Rotate the tracking knob in both directions while adjusting the guide roller, in order to obtain an envelope waveform which is as flat as possible. If the tape is above or below the helical tape position, the PB chroma waveforms will take the shape shown in Fig. 1-21.
      Adjust for maximum flatness of the envelope according to the figure.
      Note:
      Adjustment is made for CH-1 of switching point (low level). The broken lines indicate the envelope waveform when the tape play is extreme.
      After adjustment, tighten the setscrew of the guide roller firmly.
      Playback tape an alignment (VROCPSV) again in the unloading mode, and make sure that there is no change in the PB chroma output.
   d. The X-Position is adjusted after tape drive train. Set the tracking knob to the "preset" position, rotate the X-position adjusting nut shown in Fig. 1-22. with the special bladed screwdriver for maximum switching pulse low side envelope, and then adjust the A/C head position. Adjust the head switching point to 6.5 ± 0.5H after adjustment of the X-position.
      Check the flatness of envelope and sound by self-recording.

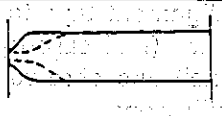
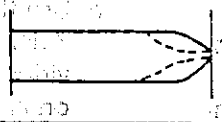
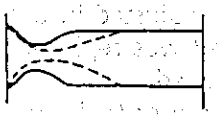
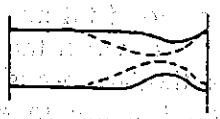
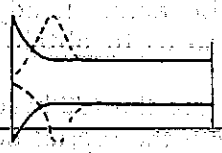
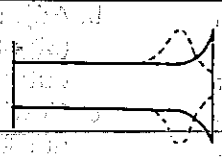
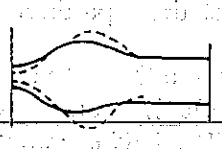
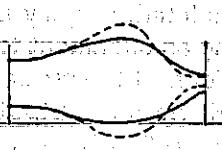
	Tape too high		Tape too low	
	Supply side	Take-up side	Supply side	Take-up side
				
				
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope	Supply side guide roller rotated in counterclockwise direction (raises guide roller) to give the tape some play. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to give the tape some play. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope

Figure 1-21.

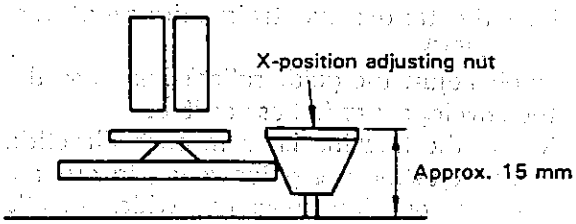


Figure 1-22.

REPLACEMENT OF UPPER DRUM

Note:

The engagement between the lower drum (outer diameter) and the upper drum (inner diameter) is very accurate, in the order of microns, and care should be paid to their replacement. Even a slight entry of foreign material will affect the accuracy of their reassembly.

- **Replacement (See Fig. 1-23)**

1. Unsolder the leads ① to ④ from the video head and remove them.
2. Remove the two screws ⑤ (brass screws with washers (W3P + 9S) using a phillips screwdriver.
3. Withdraw the upper drum by pulling it up with the upper drum replacement jig. (Refer to Fig. 1-23.)

Notes:

1. Avoid touching the drum surface with bare hands.
2. Do not hit the screws when tightening them.

- **Reassembly**

1. Set the new drum for replacement, as shown in Fig. 1-23, and position the leads properly.

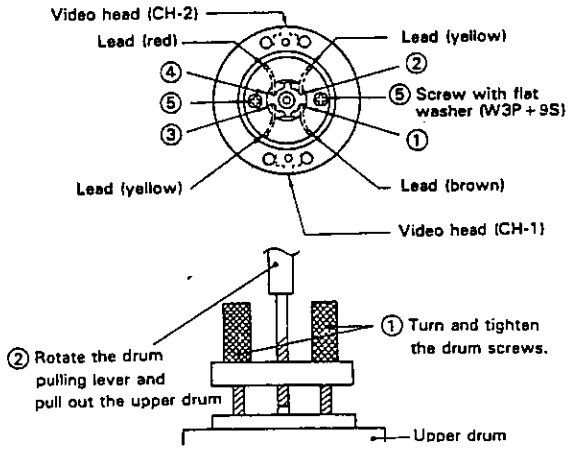


Figure 1-23.

Notes:

1. Before replacing the upper drum, check that there are no scratches or dust on the edge or the outer surface of the lower drum.
2. Before replacing the upper drum, check that there are no scratches or dust on the edge or the inner surface of the upper drum.
3. On assembling these parts, slowly insert the upper drum onto the lower drum with the upmost care, so that the upper drum is not tilted.
4. When assembling these parts, do not allow foreign material to come between them.
5. Do not use excessive force when driving in the screws.

2. Fasten the upper drum in place with the two screws ⑤.
3. Solder the leads from the video head ① to ④ to their respective pads.

Note:

Soldering should be performed quickly and carefully without touching adjacent patterns.

4. After replacement, be sure to check the tape drive train adjustment and the following.
   - Adjustment of the playback switching point (See page 21)
   - Checking and adjustment of the X-position (See page 15)

REPLACEMENT OF THE MECHANISM CONTROL ASSEMBLY

- **Removal (Fig. 1-24)**

1. Unsolder the cam switch terminal.
2. Remove the E-ring ①.
3. Remove the three screws ② (LX-HZ3027GEFD).
4. Remove the mechanism control assembly ③.

- **Installation (Fig. 1-24)**

1. Remove the cut poly-slider washer ④.
2. Remove the relay gear (B) ⑤.
3. Adjust the position of the shifter assembly (A) 11 so that the alignment hole Ⓐ of the chassis is aligned with the alignment holes of the shifter assembly and brake drive lever 13. (Remove the main brake spring 14 for easier positioning.)
4. Remove the tension arm spring, and fully turn loading gears (A) Ⓑ and (B) ⑩ in the direction indicated by the arrow Ⓑ, to get the mechanism in the unloading mode.
5. Remove the full erase head spring 29 (see page 3) .
6. Turn the brake cam ⑥ of the mechanism control assembly in the direction indicated by the arrow until the alignment hole Ⓒ of the segment gear is at the center of the segment alignment hole for the auxiliary angle.
7. Attach the mechanism control assembly ③ to the main chassis. This can be done easily if the shifter assembly (A) 11 is moved to the left and right.
8. Secure the three screws ②.
9. Put the E-ring ① on.
10. Solder the cam switch terminal.
11. Install the relay gear (B) ⑤.
12. Install the washer ④.
13. Attach any removed springs such as the main brake spring 14 . (See page 3)

Notes:

1. Do not exceed the specified torque when tightening the screws or the threads in the boss may become damaged.
2. After replacement, check the position of the parts, and confirm that the unit operates in all modes.

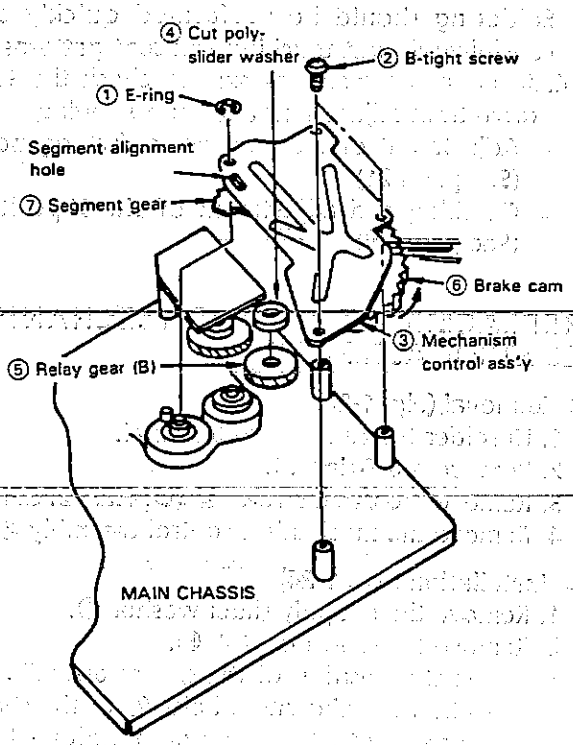


Figure 1-24.

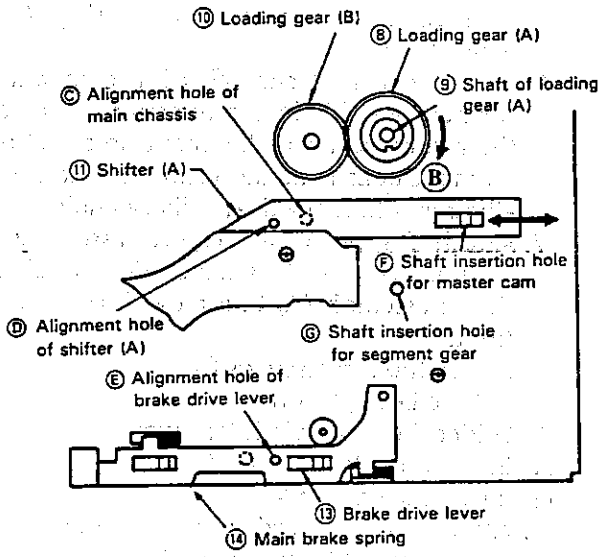

⑩ Loading gear (B)
⑧ Loading gear (A)
⑨ Shaft of loading gear (A)
Ⓒ Alignment hole of main chassis
⑪ Shifter (A)
Ⓕ Shaft insertion hole for master cam
Ⓓ Alignment hole of shifter (A)
Ⓖ Shaft insertion hole for segment gear
Ⓔ Alignment hole of brake drive lever
⑬ Brake drive lever
⑭ Main brake spring

Figure 1-25.

REPLACEMENT OF THE CAM SWITCH

- **Removal (Fig. 1-26)**

1. Removal the cut poly-slider washer ① and tension release lever ⑧.
2. Detach the brake cam ② from the mechanism bracket ③.
3. Remove the cam switch ④ while keeping its clips in the arrow directions. (See Fig. 1-26 (B).)

- **Installation**

1. Put the cam switch ④ to the brake cam ②.
2. Install the assembly of the cam switch ④, brake cam ② and tension release lever ⑧ to the mechanism control bracket ③.

Note:
When attaching to the mechanism control unit, make sure that the alignment mark Ⓐ of the master cam is aligned with alignment mark Ⓑ of the brake cam, and line up the torque change lever with the groove on the brake cam.

3. Put the cut poly-slider washer ① on.

Notes:

1. After assembly, rotate the brake cam and check that the torque change lever goes into the groove on the cam.
2. When replacing the master cam and brake cam, be sure to apply a light coating of grease to the cam groove.

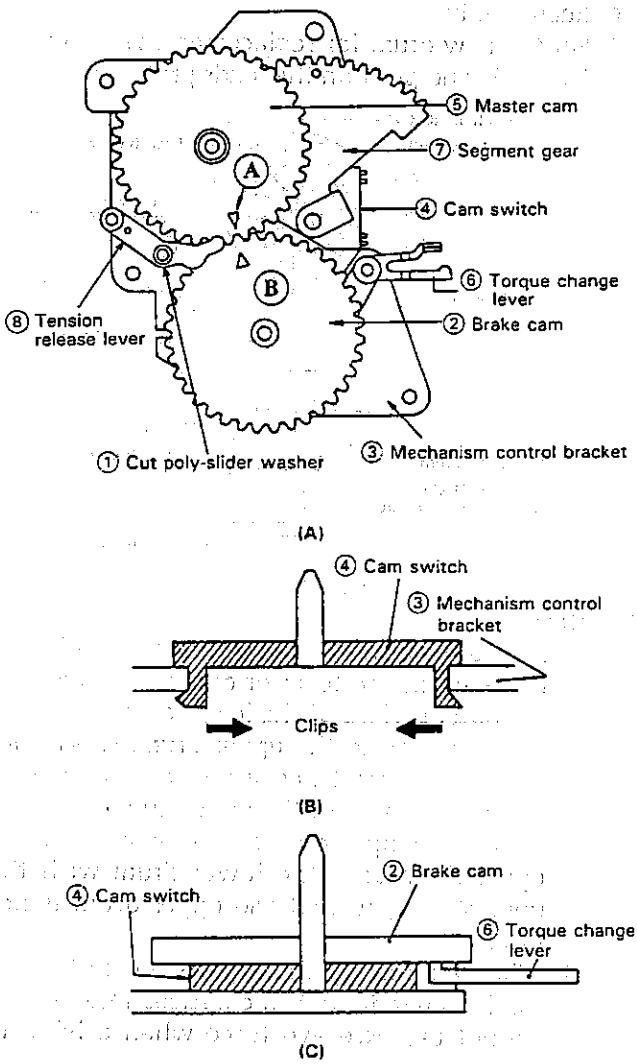


Figure 1-26.

REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

- **Removal**

1. Remove the lead wire connector ① (flat type) from the capstan D.D. control PWB ⑥. When removing the connector, push down on the board in order to prevent the board from breaking.
2. Remove the screw ③ which holds the capstan D.D. motor control PWB ⑥ on the main chassis. Remove the screw ④ which holds the capstan D.D. motor heat sink panel onto the main chassis.
3. Remove the three screws ② 2.6P + 5.5S (S-cup) (LX-HZ3036GEFD), and remove the capstan D.D. motor 5 from the main chassis.

- **Installation**

1. Mount the capstan motor on the main chassis while making sure that the capstan shaft does not come into contract, and attach it with the three screws ②.
2. Attach the capstan D.D. motor control PWB ⑥ on the main chassis with the B-tight screw ③. Attach the capstan D.D. motor heat sink panel on the main chassis with the cup-tight screw ④.
3. Insert the lead wire connector ① (flat type) into the capstan D.D. motor control PWB ⑥.

Notes:

1. After installing the capstan D.D. motor, be sure to rotate the capstan motor and check the movement.
2. Check and adjust the servo circuit.
3. Do not exceed the specified torque when tightening the B-tight screws ③ or the threads in the boss may become damaged.

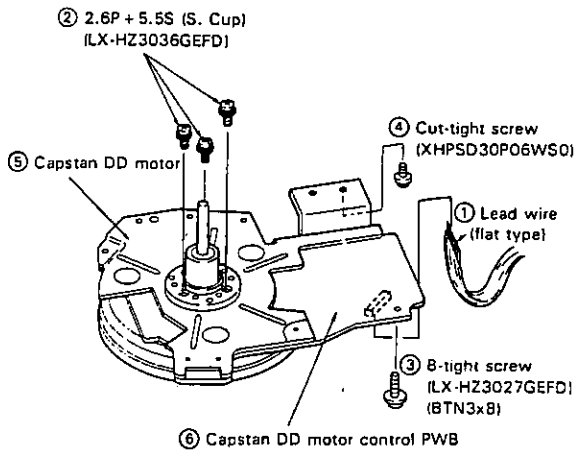


Figure 1-27.

CHECKING THE UNIVERSAL BRAKE LEVER

- **Checking**

1. Remove the cassette housing.
2. Push the playback button to set the unit to the playback mode.
3. Remove the reel idler from the take-up reel disk, and set the torque gauge (JIGTG0090).
4. Slowly rotate the torque gauge so that the reel disk and torque gauge pointer turn with the equal speed, and check that the set value is as specified (within 40 ± 10 g.cm).

REPLACEMENT OF THE LOADING MOTOR

- **Replacement (Fig. 1-28)**

1. Remove the four screws (XEBSD40P16000) securing the mechanism chassis to the plastic frame.
2. Disconnect the drum D.D. (direct drive) motor lead connector and the loading motor relay lead NF connector.
3. Remove the loading belt ①.
4. Remove the cup-tight screw ⑥ (XHPSD-30P08WS0). Tilt the mechanism chassis for easy removal.
5. Remove the two screw ② (XBPSD30P05J00) and remove the loading motor ④ from the loading motor holder ③.
6. Remove the loading motor PWB ⑤.
7. Replace the loading motor along with the pulley ⑦.

Notes:

1. Check that the space between the motor and the loading motor pulley is 4.5 ± 0.1 mm.
2. After installing the loading motor, be sure to rotate the loading motor and check for smooth movement.

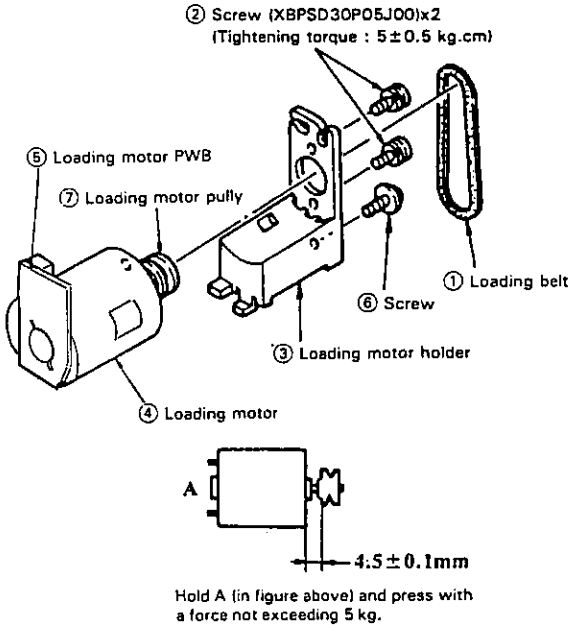

② Screw (XBPSD30P05J00)x2
(Tightening torque : 5±0.5 kg.cm)
⑤ Loading motor PWB
⑦ Loading motor pully
① Loading belt
⑥ Screw
③ Loading motor holder
④ Loading motor
A
4.5±0.1mm
Hold A (in figure above) and press with a force not exceeding 5 kg.

Figure 1-28.

REPLACEMENT OF D.D. (DIRECT DRIVE) MOTOR

- Removal

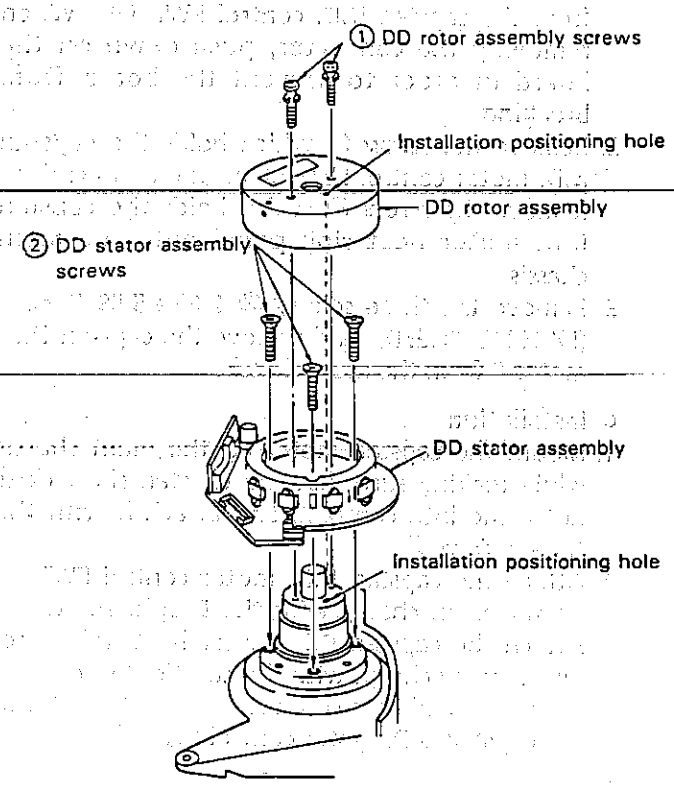
1. Remove the two screw ① (SW3P + 5S) which hold the D.D. rotor assembly in place, using a phillips screwdriver.
2. Remove the D.D. rotor assembly by pulling it straight out.
3. Remove the three brass screws ② (2.6P + 14S) which hold the D.D. stator assembly in place,using a phillips screwdriver.
4. Remove the D.D. stator assembly by pulling it straight out.

- Assembly

1. Place the D.D. stator assembly on top of the lower drum.
2. Secure the D.D. stator with the three brass screws ② (2.6P + 14S) using a phillips screwdriver.
   Note:
   Be careful not to scratch the core, windings, or hall device.
3. Insert the D.D. rotor assembly into the drum shaft.
   Note:
   Insert directly into the direction of the shaft. (Refer to Fig. 1-29 for the installation direction.)
4. Secure the D.D. rotor assembly by the screws ①.
5. Secure the D.D. rotor assembly so that the installation positioning holes in the D.D. rotor assembly and lower drum match.
6. After replacement of the D.D. motor as shown above, proceed with the adjustment of the playback switching point.
   Notes:
   1. Be sure not to damage the upper drum or the video head.
   2. Be sure that the hall device is not damaged by the D.D. rotor assembly or other parts.

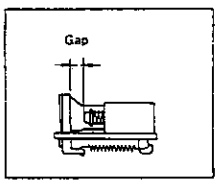
REPLACEMENT OF THE DD BRAKE SOLENOID

1. Remove two solenoid wires from the DD motor control PWB.
2. Remove two screws ①(XHPSD26P04000) securing the DD motor control PWB.
3. Remove the DD brake lever spring ②(MSPRT0239GEFJ).
4. Remove the slit washer ③(LX-WZ1006GE00).
5. Raise the DD brake lever ④(MLEVP0102GEZZ) to the direction Ⓐ .
6. Remove two screws ⑦ (XBPSD20P05J00) and two spacers ⑩ (PSPAB0019GEFW) securing the solenoid ⑤ (RPLU-0080GEZZ) and DD brake mounting plate ⑥ (LANGF9290GEZZ) .
7. Remove the slit washer ⑨ (LX-WZ1001GE00) and the spring ⑧ (MSPRC0116GEFJ) from the iron core.
8. Replace the solenoid.
   Notes:
   Keep the iron core close fitted to the solenoid, and check that there is a gap between the iron core and DD brake lever.



Note 1: Secure the DD rotor assembly so that the installtion positioning holes in the DD rotor tor assembly and lower drum match.

Figure 1-29.



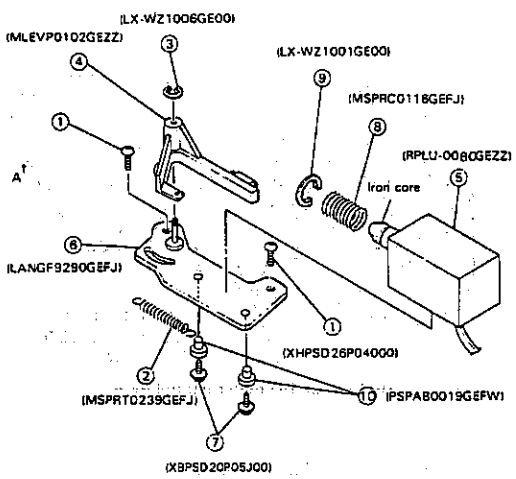


Figure 1-30.

ADJUSTMENT OF ELECTRICAL CIRCUITRY

Prior to the adjustment:
Most of the electrical adjustments are required after mechanical parts (video head included) have been replaced. Check that all the mechanical functions are normal before attempting adjustment of the electrical circuits.
Electrical adjustments require proper trouble-shooting. After repair or parts replacement the following alignments may be required.

Note:
In the table below, instruments, test points and instrument readings are listed in this order.

■ ADJUSTMENT OF SERVO CIRCUIT

Tracking preset adjustment: R707

Oscilloscope	CH-1: TP701	Shown in Figure 2-1

(Internal Trigger : CH-1(+) Side)

1. Insert the alignment tape (VROCPSV) into the unit.
2. Playback the tape and set the playback tracking control at the "center click" position.
3. Adjust R707 (preset control) to provide the waveform.

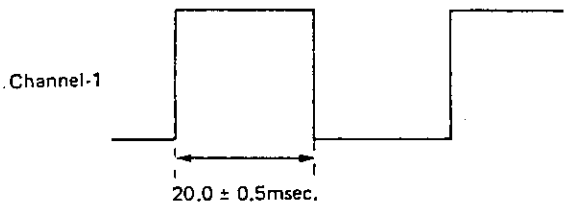


Figure 2-1.

Adjustment of the playback switching point: R720

Oscilloscope	CH-1: TP703 CH-2: Video Output Terminal	Shown in Figure 2-2

1. Insert the alignment tape (VROCPSV) into the unit.
2. Using the puls (-) trigger slope of the oscilloscope, adjust R720 (CH-1) to provide a waveform of 6.5 ± 0.5H as shown in Fig. 2-2.
3. Disconnect the oscilloscope.
4. Remove the alignment tape.

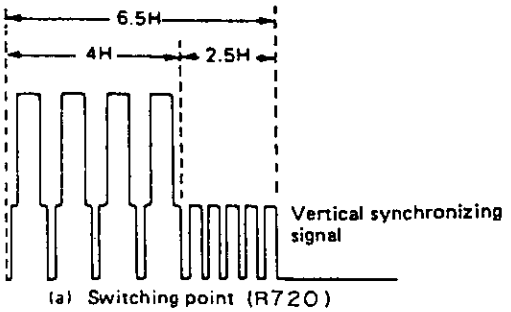


Figure 2-2

■ ADJUSTMENT OF Y/C CIRCUIT

Adjustment of EE level: R253

Note:
Connect a 75 ohm resistor between the video output and ground.

Oscilloscope	Video Output Terminal	Shown in Figure 2-3

(External Trigger : TP2201 on Main PWB.)

1. Put the unit in the record mode.
2. Apply a colour bar signal to the unit.
3. Adjust R253 (EE level control) so that the waveform.
4. Remove the 75 ohm resistor.

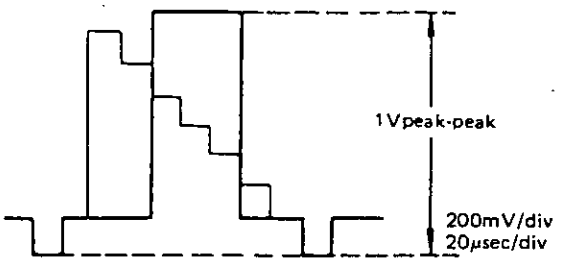


Figure 2-3.

Adjustment of playback video signal level: R209

Note:
Connect a 75 ohm resistor between the video output and ground.

Oscilloscope	Video Output Terminal	Shown in Figure 2-4

(External Trigger : TP2201)

1. Put the unit in the Playback mode, an alignment tape (VROCPSV) with a colour bar waveform.
2. Adjust R209 (playback level control) so that the waveform.
3. Remove the 75 ohm resistor.

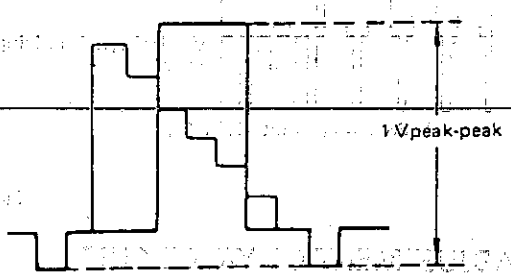


Figure 2-4.

Adjustment of FM 3.8 MHz and 4.8 MHz: R216, R222

1. Turn R229 (white clip control) counter clockwise as far as it will go and release the white clip.
2. Confirm that EE level and PB level are within the specified values.
3. Put the unit in the record mode.
4. Connect a frequency counter to ⑤Pin of IC201 and adjust R216 (FM carrier) so that the reading becomes 3.8MHz.
5. Aplly a colour bar signal to that unit.
6. Connect the oscilloscope (external trigger : TP2201) to video output (75Ω terminal). When the auto record and playback level is less than 1.0Vp-p, turn R222 (deviation) counter-clockwise; when it is more than 1.0Vp-p, turn R222 clockwise. Repeat this until the reading becomes 1.00 ± 0.05Vp-p. (refer to Fig. 2-3)
7. Unplug the standard colour bar and input a pin plug and short circuit the input. Connect a frequency counter to ⑤Pin of IC201 and confirm that the reading is 3.8 MHz.
8. White clip controls are released at step 1, so readjustment must be performed.

Adjustment of white clip: R229

Oscilloscope	TP201	Shown in Figure 2-5

1. Put the unit in the record mode.
2. Apply a colour bar signal (stair-case waveform) to the unit.
3. Adjust R229 (white clip control) so that the resultant waveform.

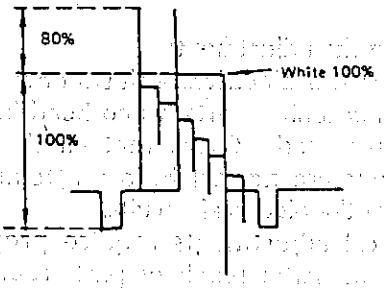


Figure 2-5.

Adjust of FM record circuit: R263, R515

Dual-trace Oscilloscope	GND: TP-32 CH-1 SIG: TP-31 (On the Head Amp PWB)	25mVp-p (Figure 2-6) 140mVp-p (Figure 2-7)

(External Trigger : TP2201/The GND of the external trigger should not be connected to ground.)

1. Put the unit in the record mode.
2. Apply a colour bar signal to the unit.
3. Connect the GND of the dual-trace oscilloscope to TP-32, CH-1 SIG to TP-31. TP31 and TP-32 are on the Head Amp PWB.
4. Set R263 (Record FM level control) to "minimum" position.
5. Adjust R515 (record chroma level control) so that the red signal output is 25mVp-p. (Fig. 2-6).
6. Adjust R263 (record FM) so that the sync tip is 140 mVp-p. (Fig. 2-7)

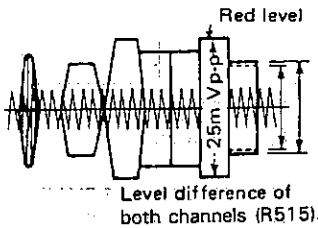


Figure 2-6.

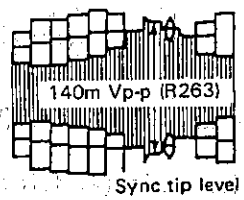


Figure 2-7.

APC Adjustment:R507

Frequency Counter	Y/C PWB Connector 12 pin	4.433619 MHz ± 10 Hz

1. Insert the alignment tape (VROCPSV) into the unit.
2. Adjust R507 so that the frequency 4.433619 MHz ± 10 Hz.

■ ADJUSTMENT OF AUDIO CIRCUIT

Adjustment of the playback output level: R609 (on Audio PWB)

VTVM	Audio Output Terminal	– 9dBm ± 0.5dBm

1. Playback an alignment tape (VROCPSV) with 1 kHz signal, for level calibration.
2. Adjust R609 (playback level control) to attain an output level.

Erase Voltage/oscillator frequency checking

Oscilloscope Frequency Counter	Both Terminals of Full Erase Head	40Vp-p 70kHz ± 7kHz (Fig.2-8)

1. Put the unit in the record mode.
2. Make sure the erase voltage is more than 40Vp-p.
3. Make sure the oscillation frequency is 70kHz ± 7kHz.

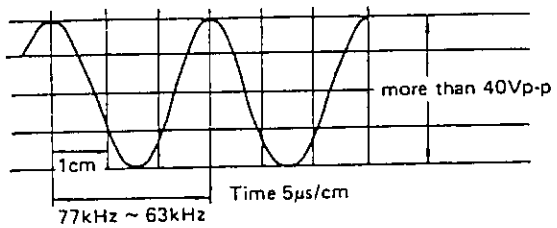


Figure 2-8.

Adjustment of the bias current: R622

VTVM	GND: TP602 SIG: TP601	2.4mV ± 0.1mV (240 ± 10μA)

1. Put the unit the record mode.
2. Adjust R622 (bias current control) so that the bias current.

Record level checking

VTVM	Audio Output Terminal	– 5dBm (436mV) ± 3dBm

1. Apply a 1 kHz, – 8 dBm (0.87Vp-p) to the audio input terminal, record it and then play it back.
2. When playing back, see that the audio output.
3. If not – 5 dBm (± 3 dBm), repeat the above adjustments.

■ ADJUSTMENT OF STILL CIRCUIT

Adjustment of still tracking preset: R769

1. Either receive a commercial broadcasting or input the video signal to the video input terminal (the input switch is outside of the unit).
2. Record a tape, and play it back.
3. Push the pause/still button to playback the recorded tape at a still mode.
4. Set the still tracking control to the center position.
5. Observing the monitor screen, adjust the R769 (still tracking preset) to the position where the noise bars disappear from the screen.
6. Push the play button to put the unit in the playback mode, and then push the pause/still button to reproduce a still picture. At this time, check to see if any noise does not appear on the screen.

Adjustment of still picture vertical syncronization: R836

1. Playback a tape.
2. Push the pause/still button to reproduce a still picture.
3. Observing the monitor screen, adjust R836 (adjustment of still picture vertical sync.—adjusted from the bottom of the unit) to the position where vertical jitter disappears from the screen.

Test Point Layout

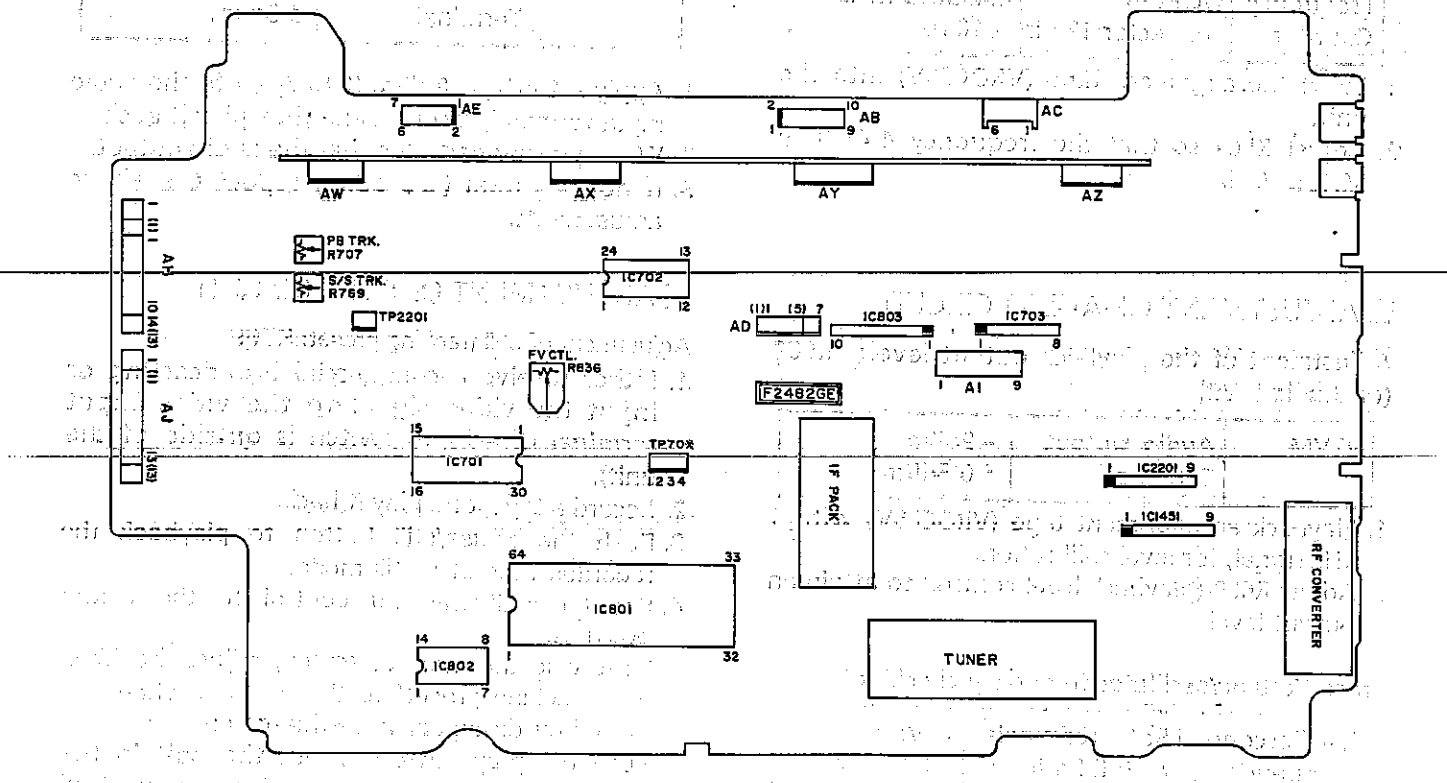


Fig. 2-9. Main Circuit

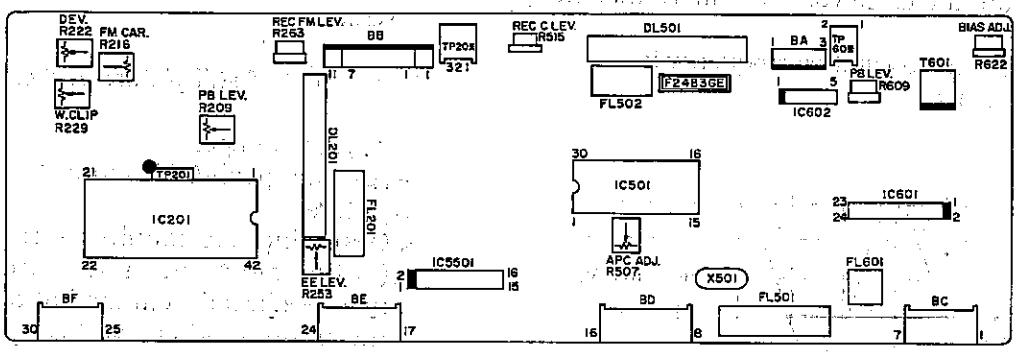


Fig. 2-10. Audio,Y/C Circuit

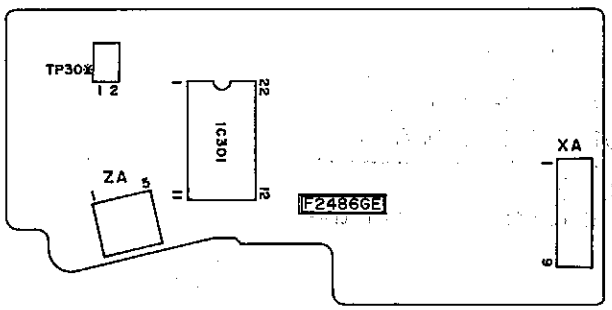


Fig. 2-11. Head Amp Circuit

TROUBLESHOOTING GUIDE

■ TROUBLES OF CONTROL SYSTEM (SERVO, SYSTEM CONTROLLER CIRCUIT)

No.	Problems	Probable causes and countermeasures
1.	No power is supplied.	• The fuse is blown out; check if there occurs a short-circuit in the internal circuit. • Check if there are produced AT5V, UR (un-regulated) 15V and AT9V in the power circuit; if not, this means that the power circuit is defective. • Check if the system controller (IC801) is normally functioning; check if there are produced reset signals at pin 28 of IC801 and clock signal at pins 29 and 30 of IC801. • Check if the power control signal (Low level) goes out of pin 52 of IC801.
2.	No operation is available.	• Check if the start sensor signal (cassette housing side) and end sensor signal are applied to pins 37 and 38 of IC801 respectively. • Check if the unit is in timer mode. • Check if the unit is in sensor stop mode. • The cam switch is poorly adjusted for its positioning.
3.	After tape lading, the unit is stopped with the tape kept would over the drum, or the cassette can't be ejected.	• The cam switch is poorly adjusted for its positioning. • IC803 is defective.
4.	The unit will stop immediately after it is set in playback or record mode.	• Check if the head switching pulse is applied to pin 25 (for the drum sensor) of IC801. • Check if the drum motor is rotating. • Check if the drum pulse generator's signal is applied to pin 7 of the servo circuit IC701
5.	The unit will stop a few seconds after it has been set in playback or record mode.	• Check if the reel pulse is applied to pin 39 (for the reel sensor) of IC801. • Check if the reel motor is rotating. • Check if the reel idler is stained or defective.
6.	The tape is not running (the tape is not taken up).	• The reel idler is defective. • The reel brake is defective.
7.	• The unit stops sometimes during playback or recording. • The tape can't be taken up when tape unloading. • The tape is scratched when it is wound. • Video search is impossible.	• Check if there are produced reel motor control signals at the system controller (servo strobe signal at 64 of IC801, servo clock signal 62 of IC801, servo date signal at 63 of IC801, capstan motor pull up signal at pin 55 of IC801, capstan motor unloading signal at pin 54 of IC801, cassette motor control signal at pin 7 of IC801, loading motor control signal at pin 6 of IC801, cassette and loading motors reverse control signal at pin 8 of IC801). • The video search circuit is defective. • IC701, IC702 and IC703 are defective.
8.	Fine noises appear at the reproduced picture.	• The playback phase control is misadjusted (R720). • The tracking preset control is misadjusted (R707).

No.	Problems	Probable causes and countermeasures
9.	Noises appear intermittently at the reproduced picture.	• Check for the capstan servo circuit (capstan frequency generator's signal at pin 14 of IC702 and playback control signal at pin 1 of IC702)
10.	The picture collapses in the horizontal direction.	• The drum servo circuit is defective. • Check if there are drum frequency generator's signal applied to pin 6 of IC701 and drum pulse generator's signal to pin 7 of IC701. • Check if there is reference signal (4.43MHz) at pin 1 of IC701.

• TROUBLES OF SOUND AND REPRODUCED PICTURE (Y/C AND AUDIO CIRCUIT)

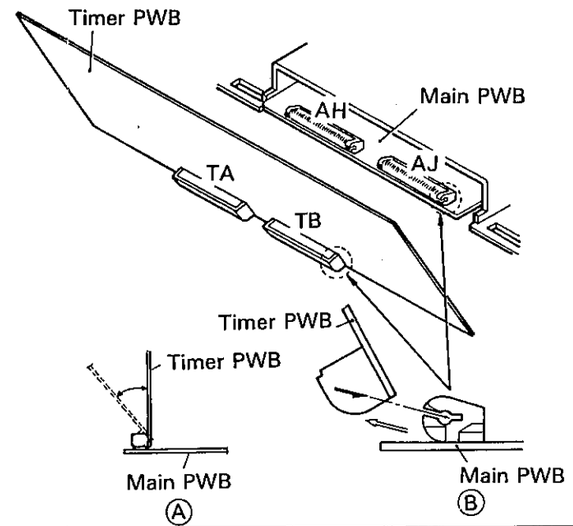
No	Problems		Probable causes and countermeasures
1.	No picture appears.	At E-E mode	• Check if the video signal (E-E signal) is applied to pin 2 of IC201, if the video signal goes out of pin 29, and if proper voltage is applied to each pin of IC201).
		At playback of standard tape.	Make sure that there appears a normal picture at E-E mode. • Check if the playback FM signal is applied to pin 10 of IC201. • Check if the playback FM signal is applied to pins 19 and 20 of IC301.
		At playback of the tape recorded by oneself.	Before this checking, make sure that normal playback is possible with standard tape. • Check if there is FM signal at pin 1 of IC201. • Check if there is video signal at pin 39 of IC201. • Check if there is video signal at pin 29 of IC201.
2.	No colour appears.		• Check if there is chroma signal at pin 30 of IC501. • APC is misadjusted (R507). It is not allowed to readjust them, this means that IC501 is defective. • Check if IC501 is normally functioning.
3.	The picture collapses when the tape recorded by oneself is played back.		• Check if there is a normal voltage at each pin of the head amplifier.
4.	Noises appear on the whole of picture when the tape recorded by oneself is played back.		• Check if there is a normal voltage at each pin of the head amplifier • Clean the video head or replace it a new one.

No.	Problems	Probable causes and countermeasures
5.	Noises is noticeable at E-E mode or when the tape recorded by oneself is played back.	• The tuner and/or RF converter are defective.
6.	Noise appear on the picture when the tape is played back with standard tape.	• Clean the video head or replace it a new one.
7.	There appears no E-E sound.	• ALC at IC601 operates improperly. • Check if there is audio signal at pin 16 of IC601. • The audio muting circuit is defective.
8.	There appears on sound at playback mode.	• The audio head is defective. • Check if playback audio signal is applied to pin 7 of IC601 and goes out of pin 16.
9.	Sound is distorted.	• The audio head is magnetized or defective. • Bias current is insufficient.
10.	The reasonance in the recording or playback is incorrect.	• The audio head is magnetized or defective. • Bias oscillator circuit is defective.
11.	Recording is impossible.	• Bias oscillator circuit is not normally functioning.
12.	Noise and hum appear frequently during playback or recording.	• The audio head is defective.

DETACHING AND ATTACHING THE CONNECTORS

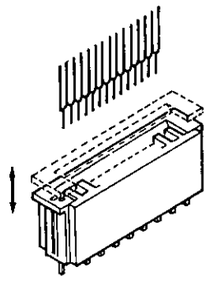
Detaching and attaching the timer PWB

(1) First undo the connector which is used to link the two connectors HA and TC.
(2) To detach the timer PWB from the main PWB, take the steps below.
  1) Release the two upper locks of the frame P. Tilt the timer PWB down to the dot-lined position (see Sketch Ⓐ).
  2) Pull out the timer PWB in the direction of arrow (see Sketch Ⓑ).
(3) To attach the timer PWB to the main PWB, take the steps below.
  1) Insert the timer PWB along the arrow mark which is given on the connector (see Sketch Ⓑ).
  2) Press up the timer PWB to the upright position on the frame P (see Sketch Ⓐ). Make sure the two upper locks are engaged tight.



Coupling the wires to connector AI

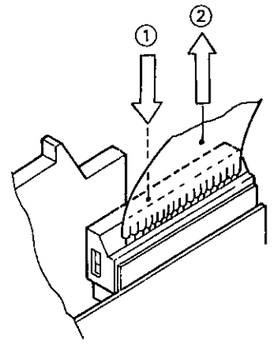
Pull up the socket coupler to the dot-lined position to unlock the coupler. Insert the wires in position.
Now push down the socket coupler to secure the wires in place.



Connector AI

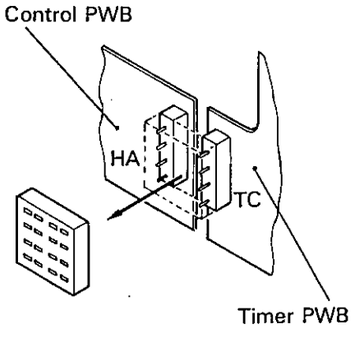
Cabling the cassette housing control connector MA

Detaching:
Press down the part ① in the direction of arrow and pull out the cable ② upward.
Attaching:
Just insert the cable ② into the connector.



Detaching and attaching the timer connector

Before detaching the timer PWB and control PWB, be sure to undo the connector which is used to link the two connectors HA and TC.



SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET. PARTS MARKED WITH "⚠" AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.
BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

SAFETY NOTES:

1. *DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.*
2. *SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.*

NOTES:

1. *The unit of resistance "ohm" is omitted (k = 1000 ohm, M = 1 Meg ohm).*
2. *All resistors are 1/8 watt, unless otherwise noted.*
3. *The unit of capacitance "F" is omitted (μ = μF, p = μμF).*

VOLTAGE MEASUREMENT CONDITIONS:

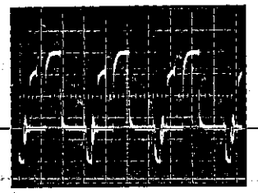
1. *DC voltages are measured between points indicated and chassis ground by VTVM, with AC240V/50Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.*
2. *Voltages are measured with 10000μV B & W or colour signal.*

WAVEFORM MEASUREMENT CONDITIONS:
10000μV 87.5 percent modulated colour ber signal is fed into tuner.

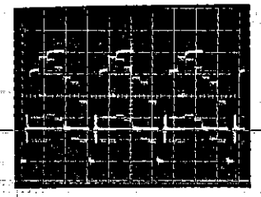
CAUTION:
This circuit diagram is original one. Therefore there may be a slight difference from yours.

WAVE FORMS

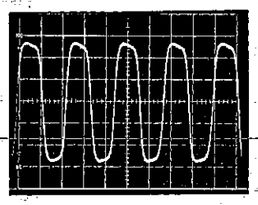
SYSTEM CONTROL, SERVO, IF PWBs



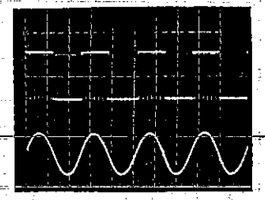
Video output terminal
(Video output is shorted with a 75 ohm resistor.)
Video signal
200mV/Division
20μsec/Division
—Playback mode—



Video output terminal (E-E level)
(Video output is shorted with a 75 ohm resistor.)
Video signal
200mV/Division
20μsec/Division
—Record mode—

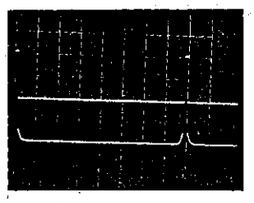


AY plug ⑫ pin
4.43 MHz oscillation signal
200mV/Division
0.1μsec/Division



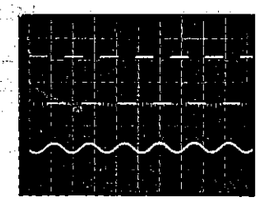
IC702 ⑭ pin
Capstan frequency generator pulse (output)
2V/Division
0.5msec/Division

Connector AB ③ pin
Capstan frequency generator signal (input)
1V/Division
0.5msec/Division
—Record mode—



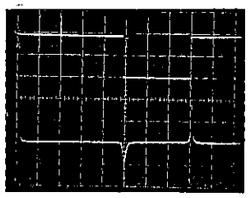
IC702 ⑱ pin
Drum phase generator pulse (output)
2V/Division
5msec/Division

Connector AC ① pin
Drum phase generator pulse (input)
200mV/Division
5msec/Division
—Record mode—



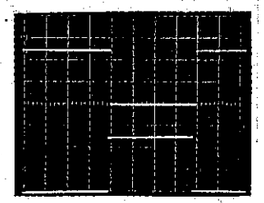
IC702 ㉑ pin
Drum frequency generator pulse (output)
2V/Division
1msec/Division

Connector AC ③ pin
Drum frequency generator signal (input)
50mV/Division
1msec/Division
—Record mode—



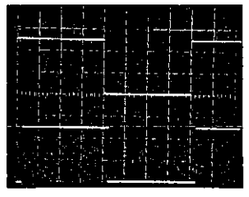
TP702
Playback control pulse
2V/Division
5msec/Division

IC702 ③ pin
Playback control pulse
500mV/Division
5msec/Division
—Playback mode—



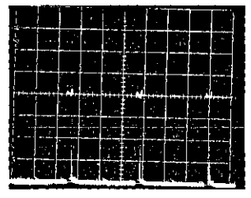
TP703
Head switching pulse
2V/Division
5msec/Division

TP701
Tracking MM pulse
2V/Division
5msec/Division
—Playback mode—

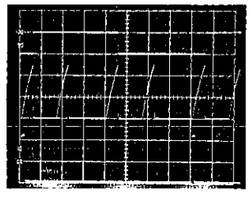


TP703
Head switching pulse
2V/Division
5msec/Division

TP701
Tracking MM pulse
2V/Division
5msec/Division
—Record mode—



TP2201
Horizontal sync pulse
1V/Division
20μsec/Division
—Record mode—

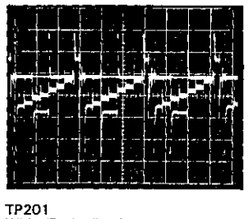


IC701 ⑨ pin
Head switching pulse
5V/Division
5msec/Division

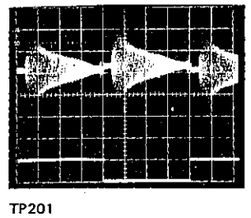
IC701 ⑧ pin
Drum pulse generator MM
2V/Division
5msec/Division

IC701 ⑦ pin
Drum pulse generator (input)
2V/Division
5msec/Division

Y/C, AUDIO PWB

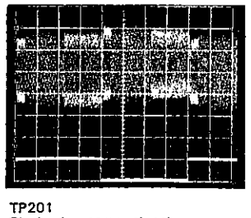


TP201
White/Dark clip signal
200mV/Division
20μsec/Division
—Record mode—



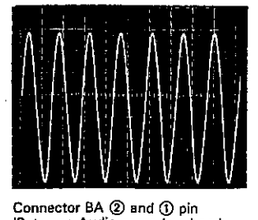
TP201
Playback preamp. signal
100mV/Division
5msec/Division

TP203
Head switching pulse
5V/Division
5msec/Division
—Playback mode—



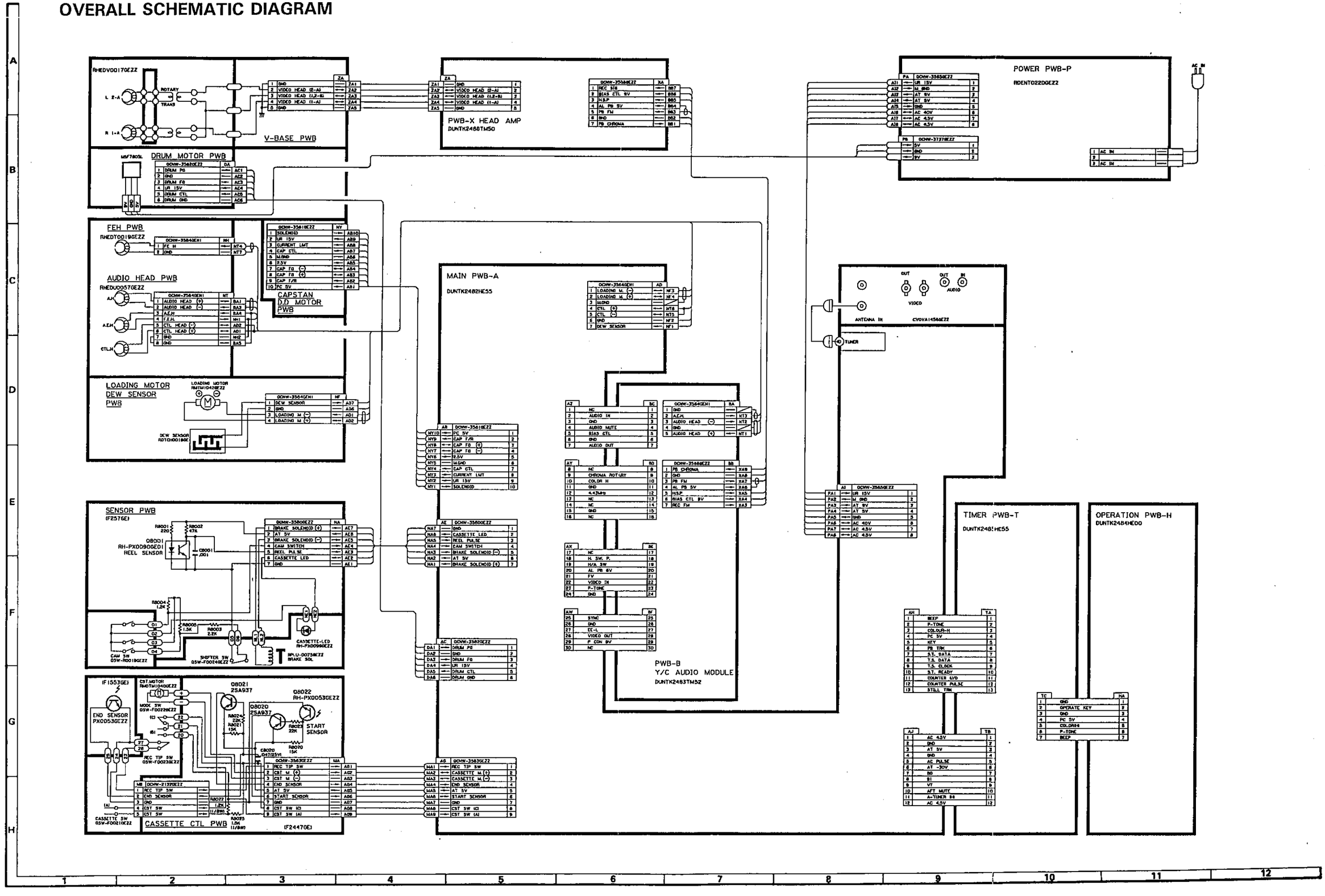
TP201
Playback preamp. signal
50mV/Division
5msec/Division

TP203
Head switching pulse
5V/Division
5msec/Division
—Playback mode—



Connector BA ② and ① pin
(Between Audio erase head and Ground.)
10V/Division
10μsec/Division
—Record mode—

OVERALL SCHEMATIC DIAGRAM



PWB-A, SYSTEM CONTROL, SERVO, IF TUNER CIRCUIT (MAIN 1)

Record reference signal

Drum control signal

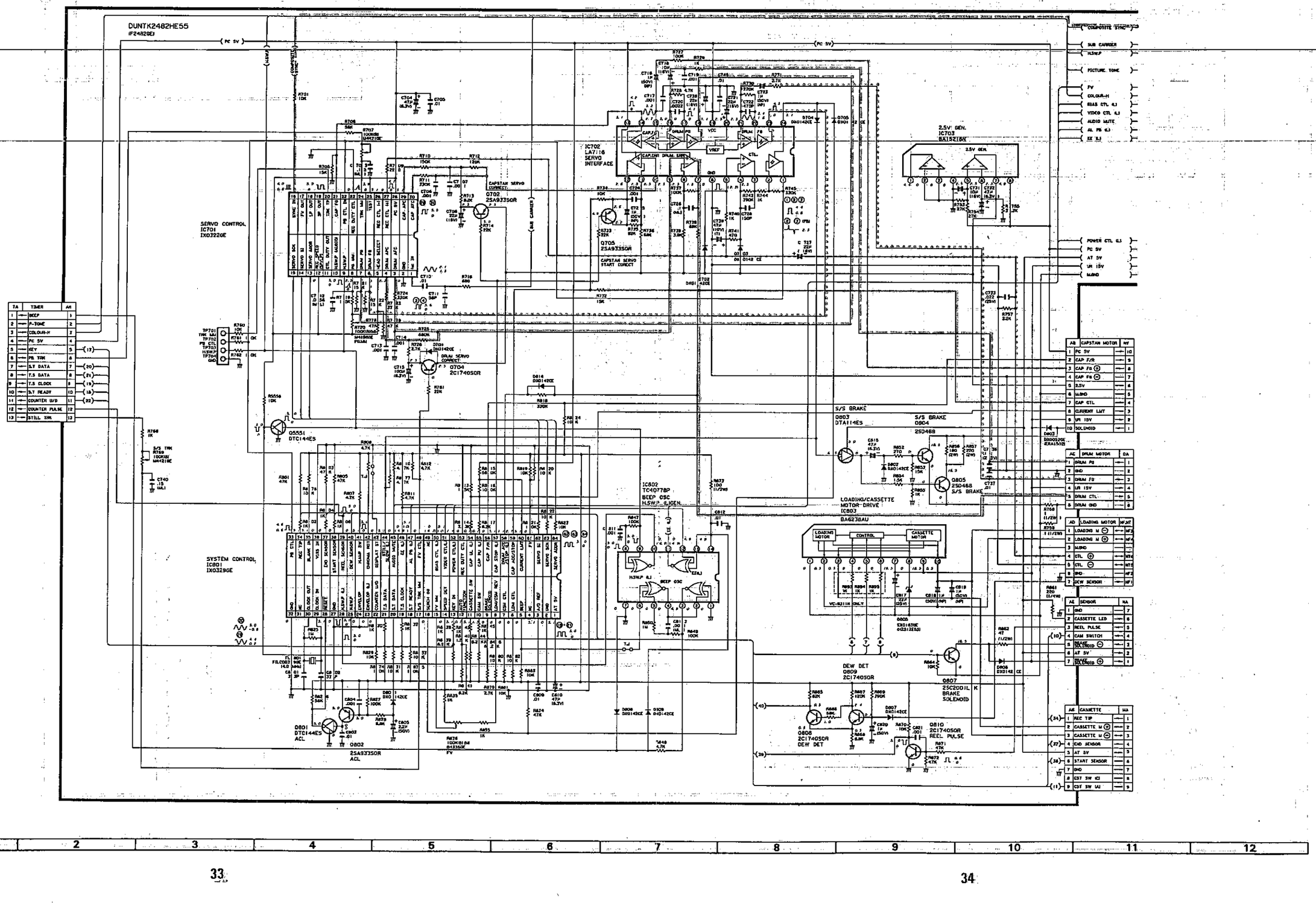
Capstan control signal

Drum phase reference signal (playback mode)

Capstan frequency reference signal

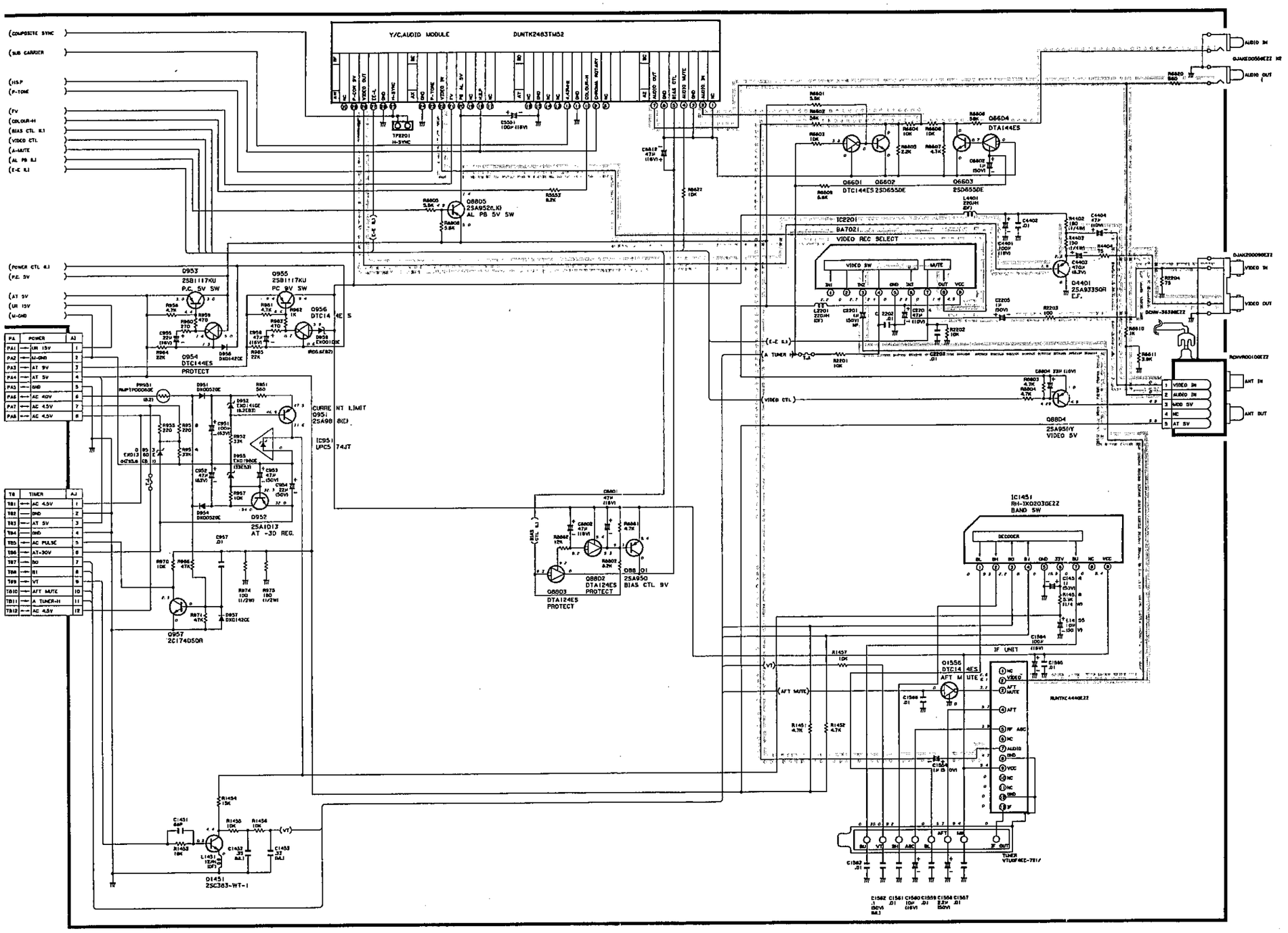
Drum frequency reference signal

Capstan phase reference signal



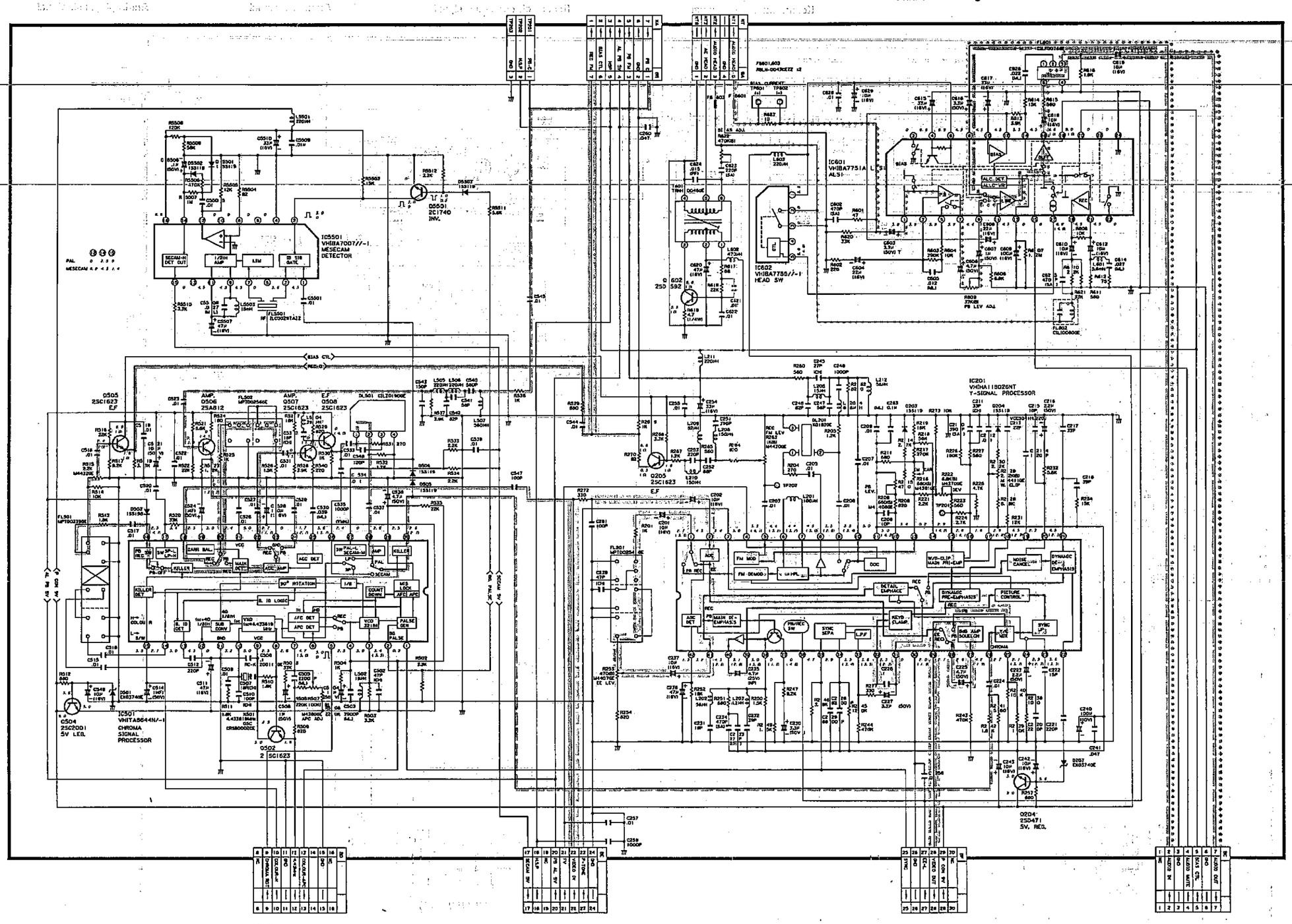
PWB-A, SYSTEM CONTROL, SERVO, IF TUNER CIRCUIT (MAIN 2)

Playback chrominance signal
Playback luminance signal
Video E-E signal
Audio record signal
Record luminance signal
Record chrominance signal
Audio E-E signal
Audio playback signal

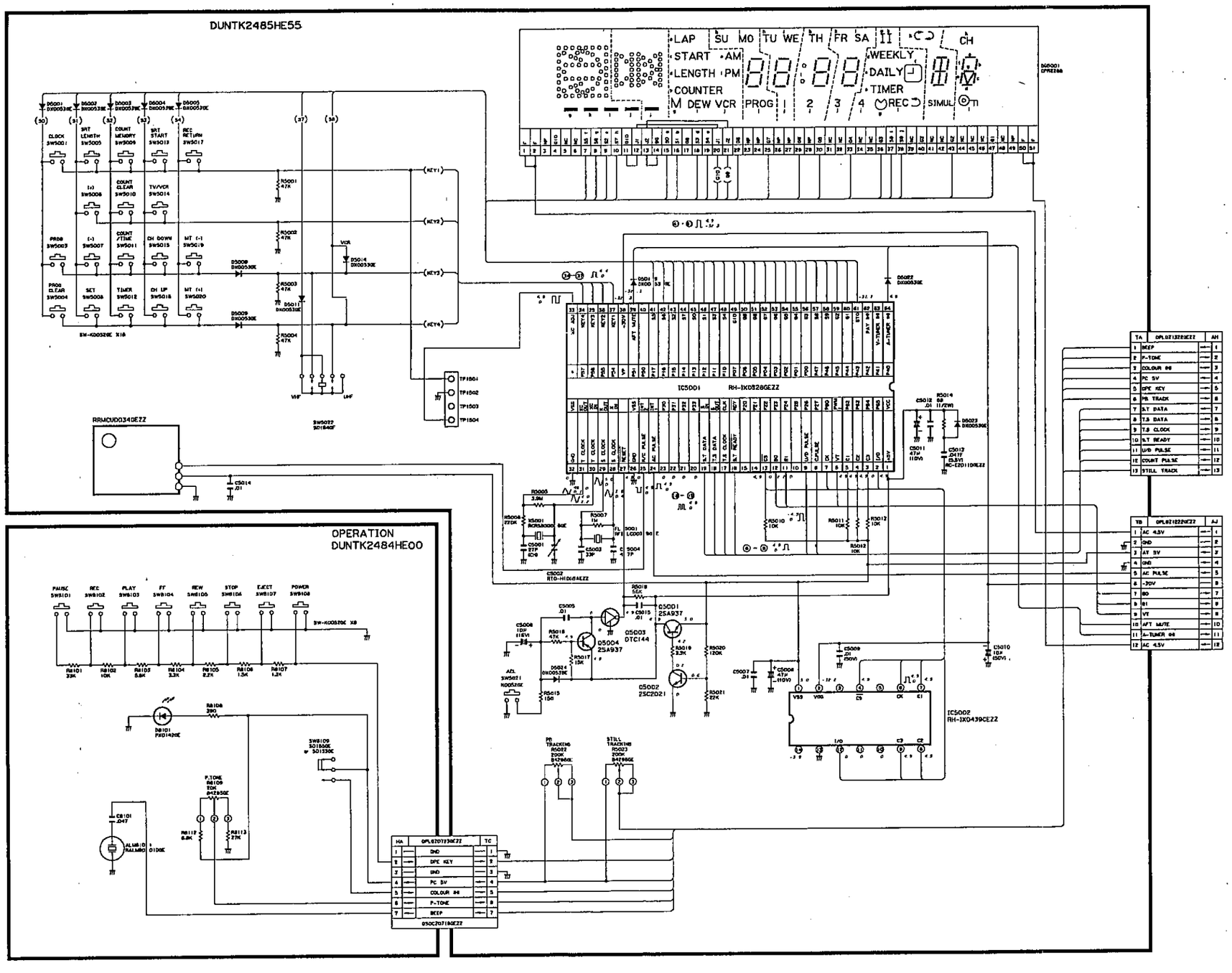


PWB-B, Y/C / AUDIO CIRCUIT

Video E-E signal
Audio E-E signal
Record luminance signal
Record chrominance signal
Audio record signal
Playback luminance signal
Playback chrominance signal
Audio playback signal



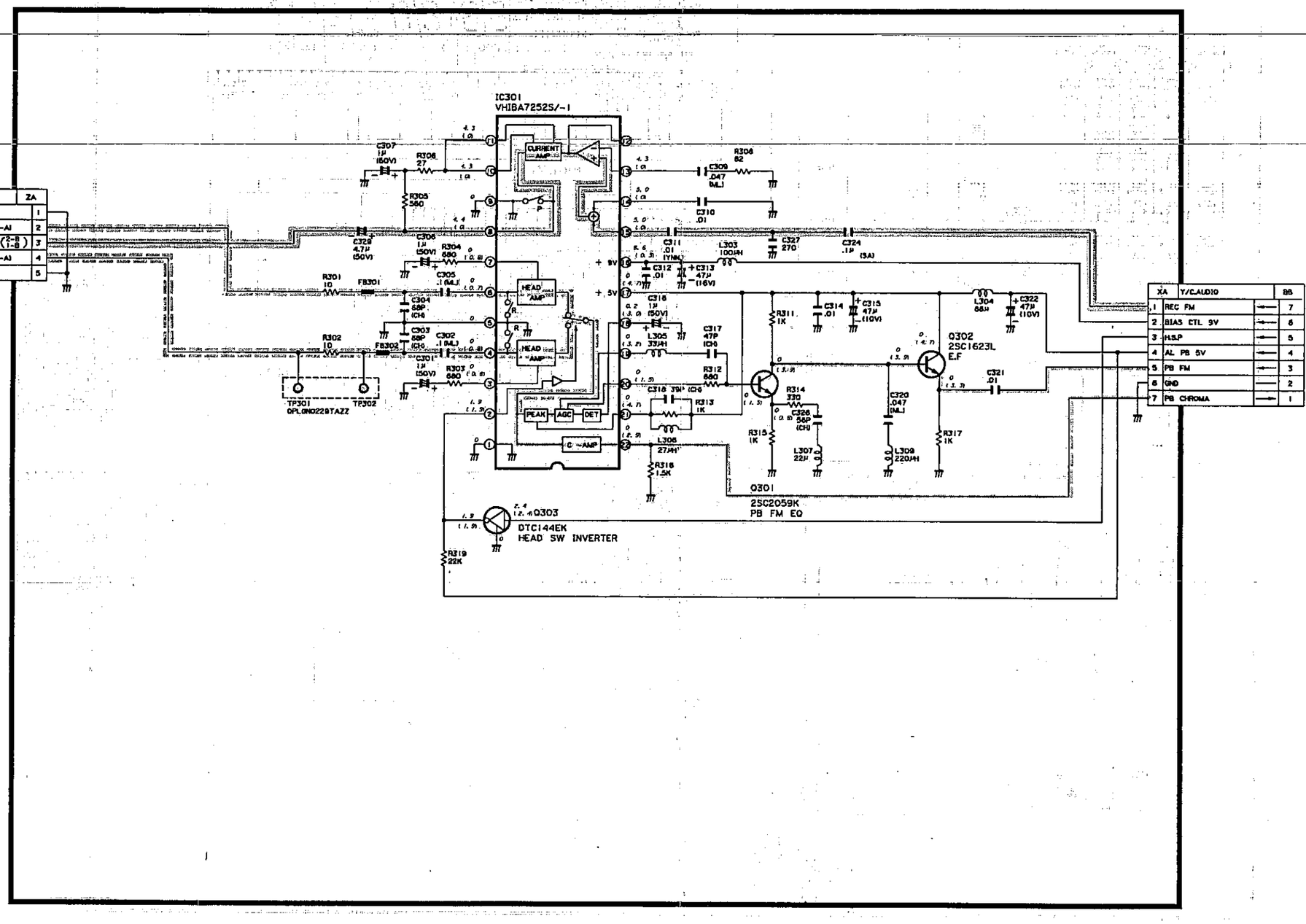
PWB-H, OPERATION CIRCUIT / PWB-T, TIMER CIRCUIT



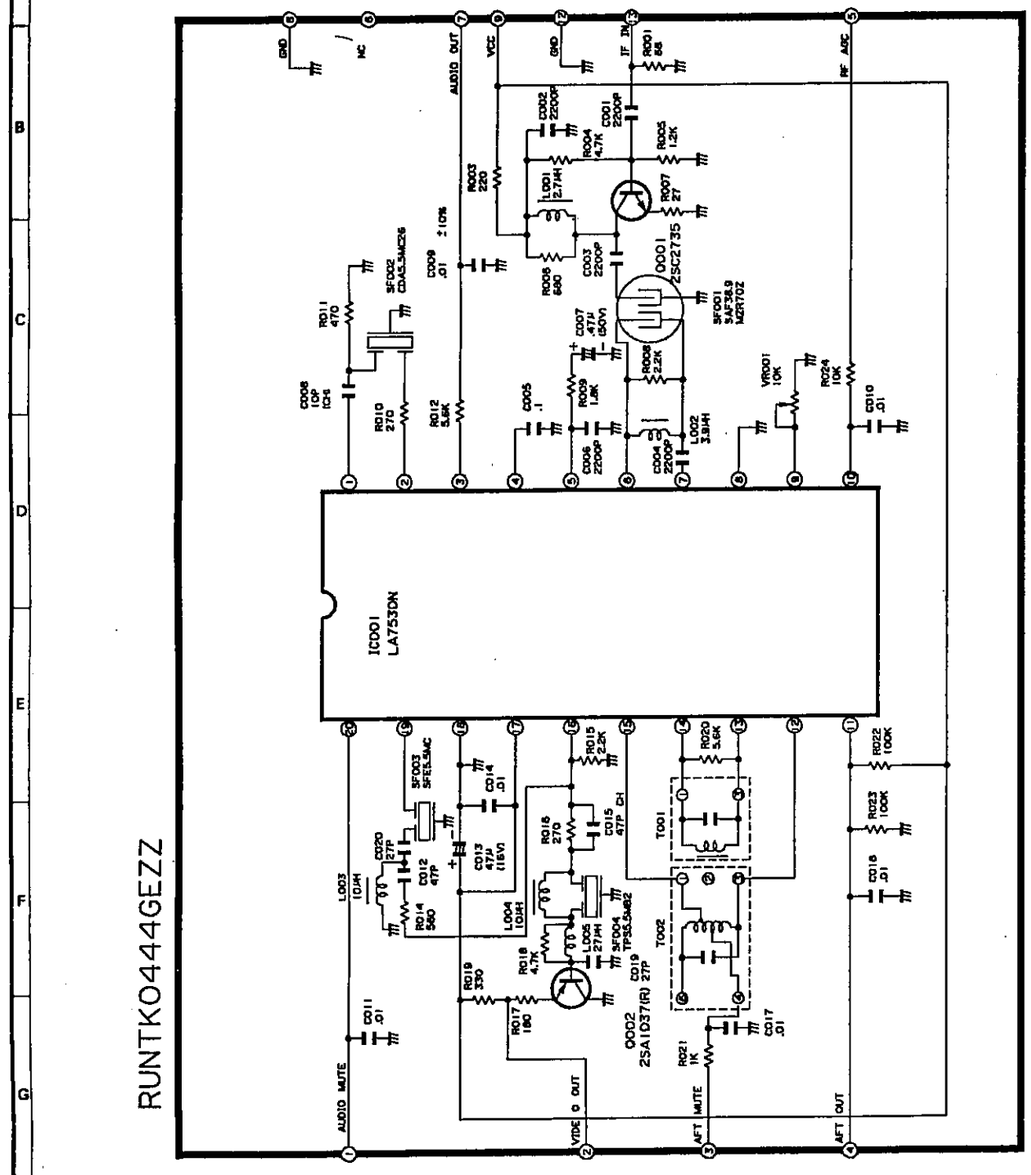
PWB-X, HEAD AMPLIFIER CIRCUIT

Record luminance signal — Playback luminance signal

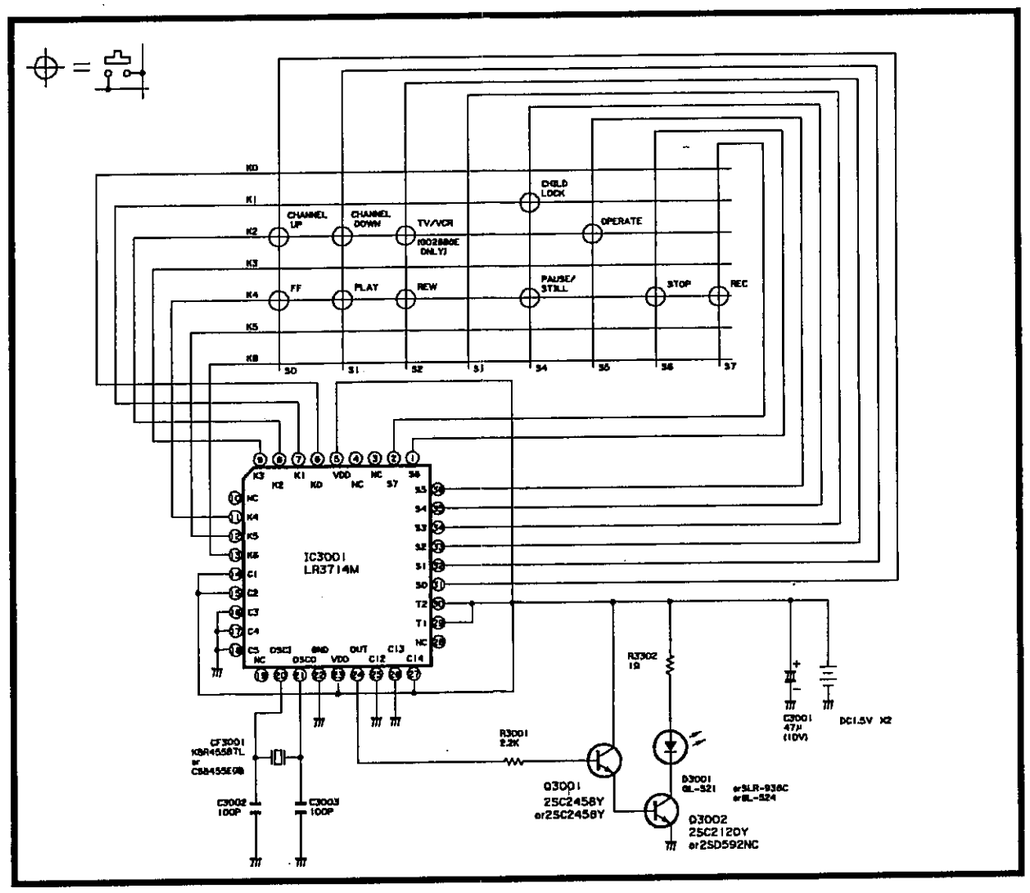
Record chrominance signal — Playback chrominance signal



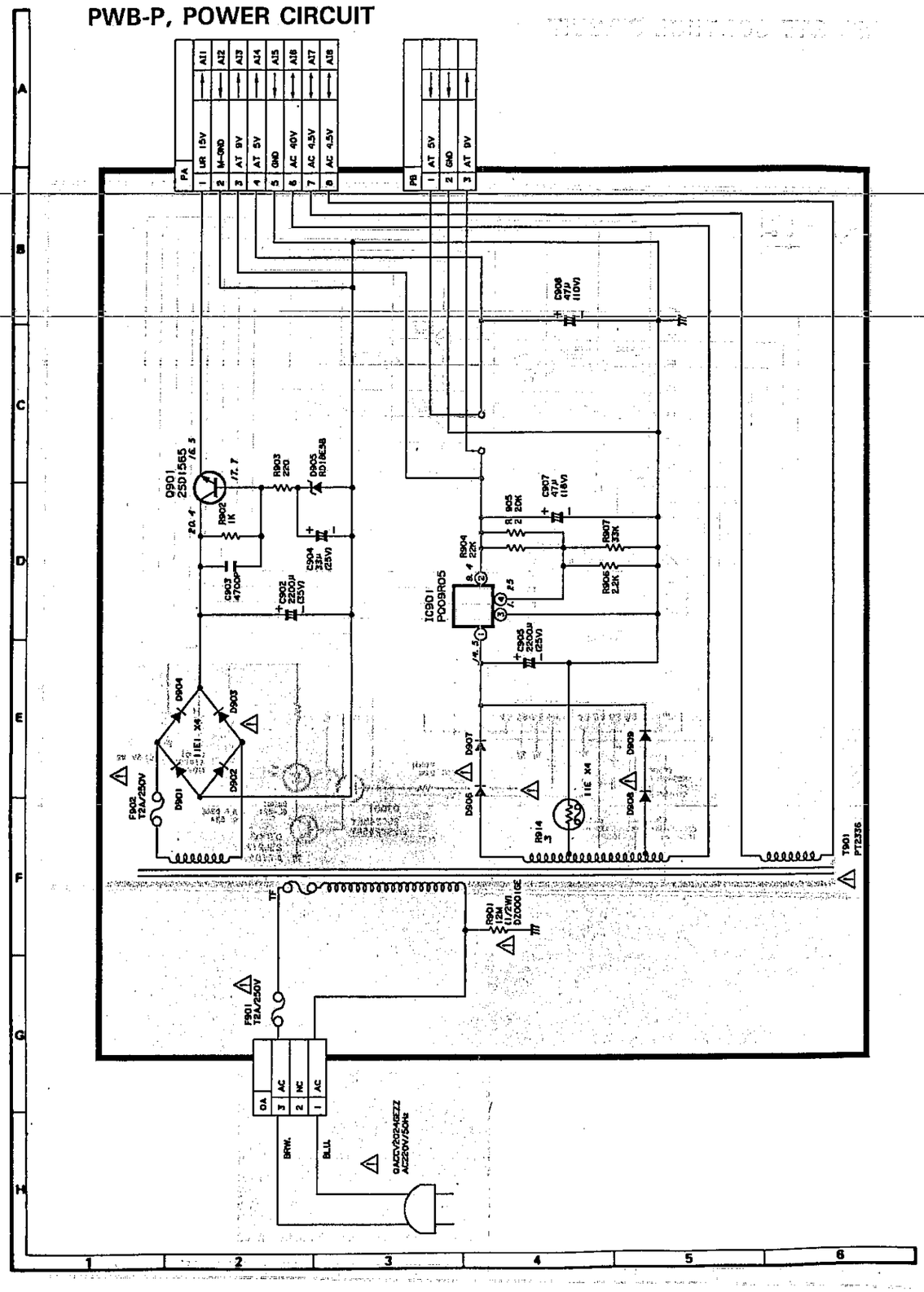
PWB-A, IF PACK CIRCUIT



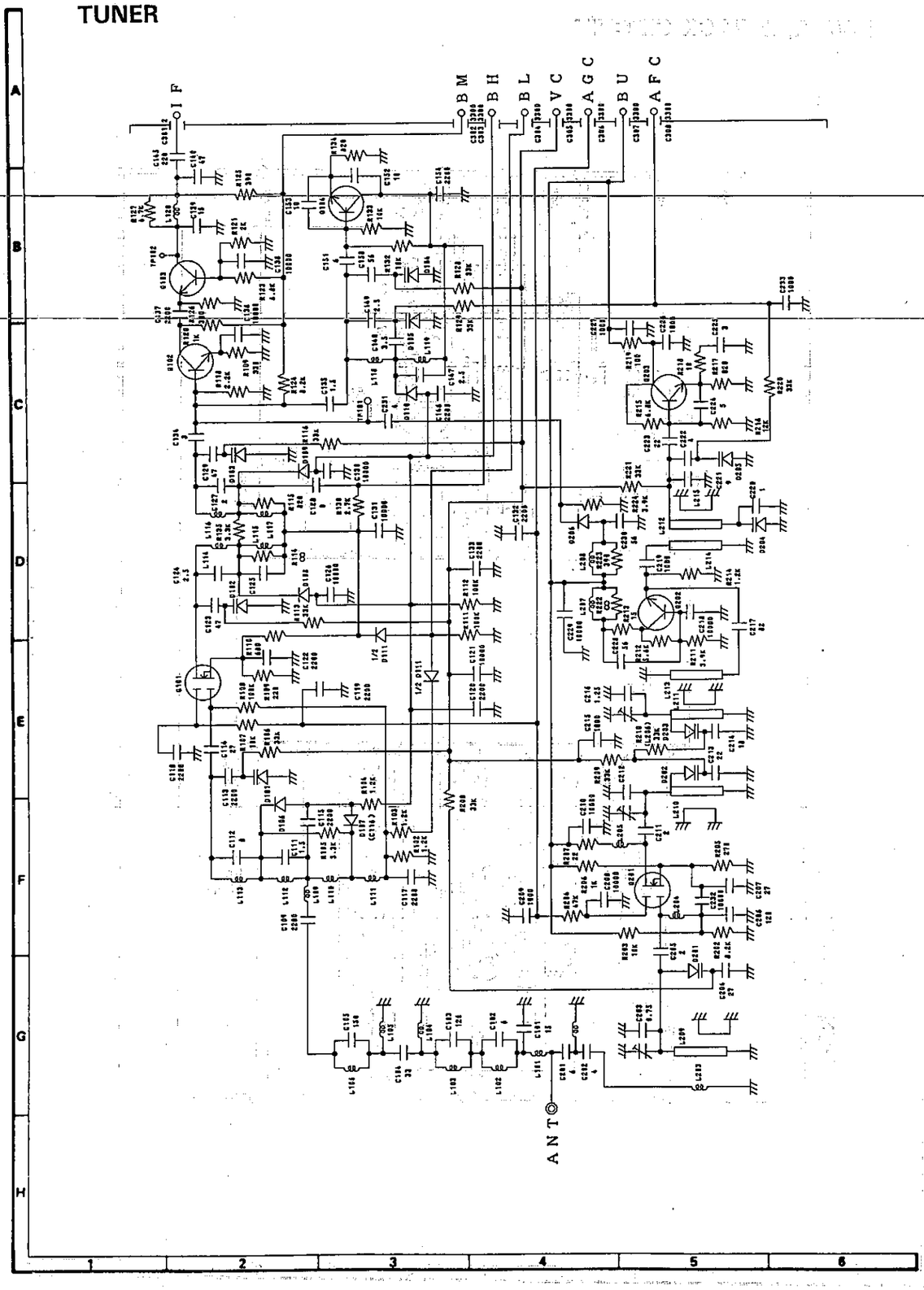
REMOTE CONTROL CIRCUIT



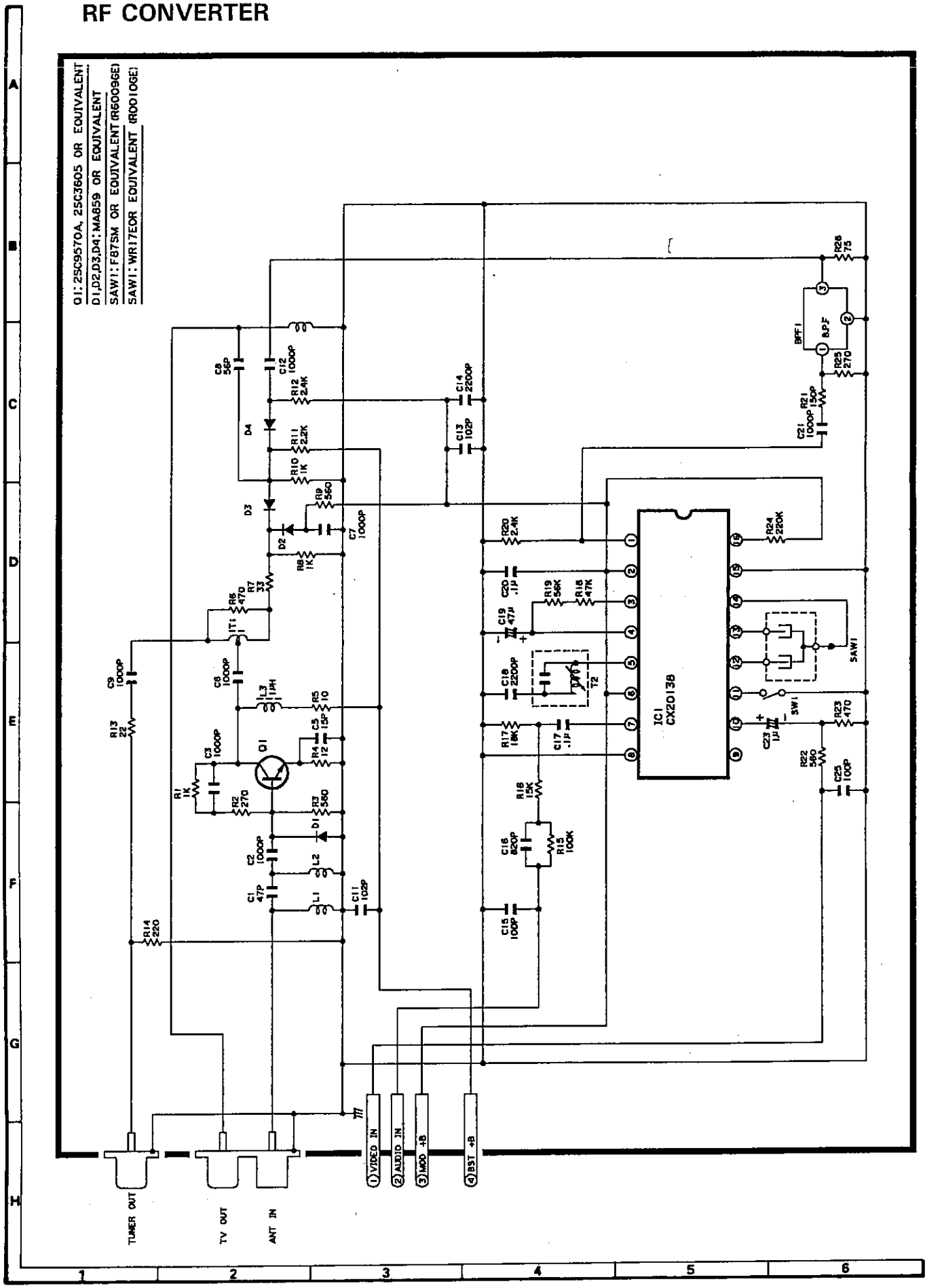
PWB-P, POWER CIRCUIT

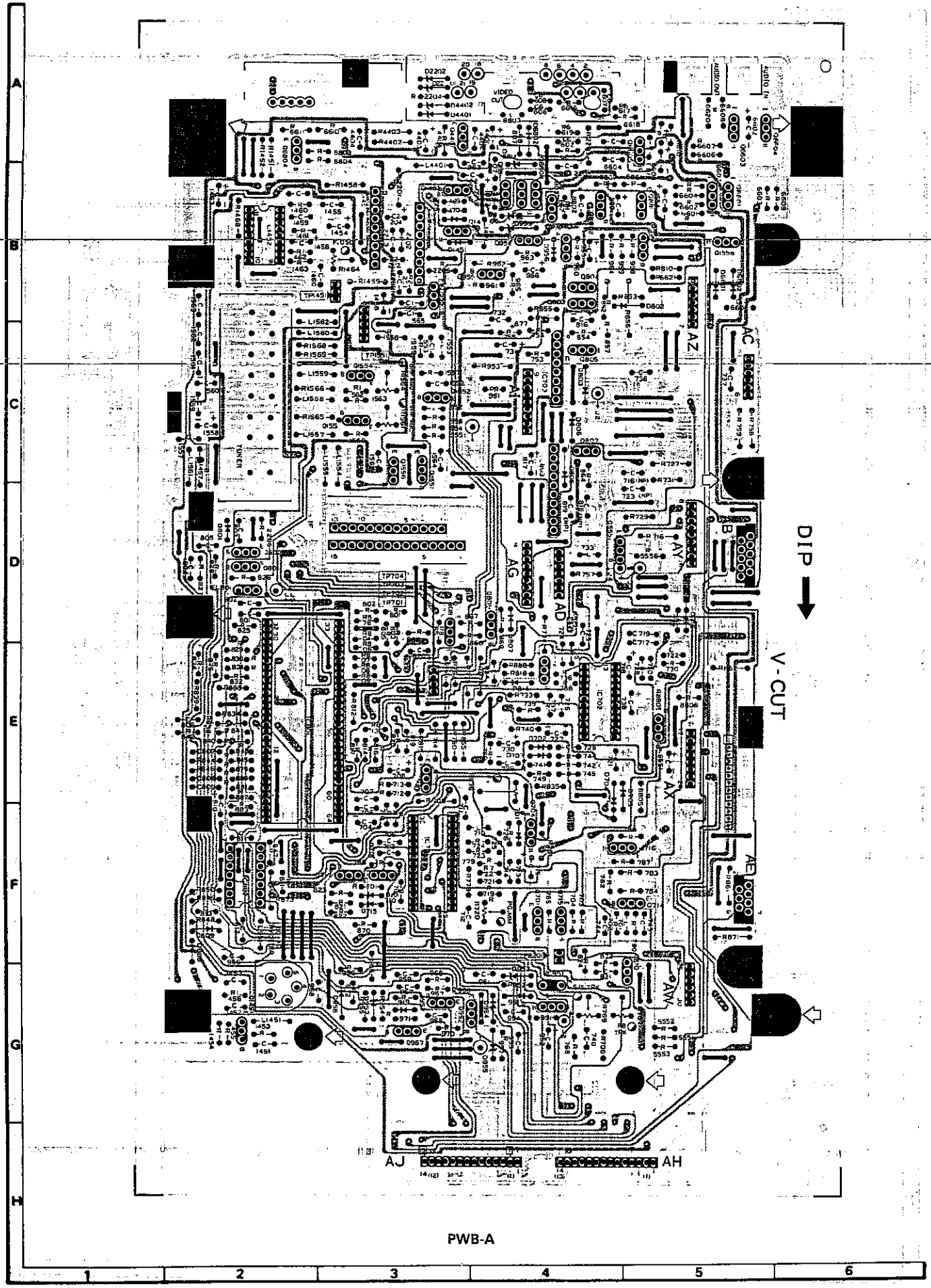


TUNER

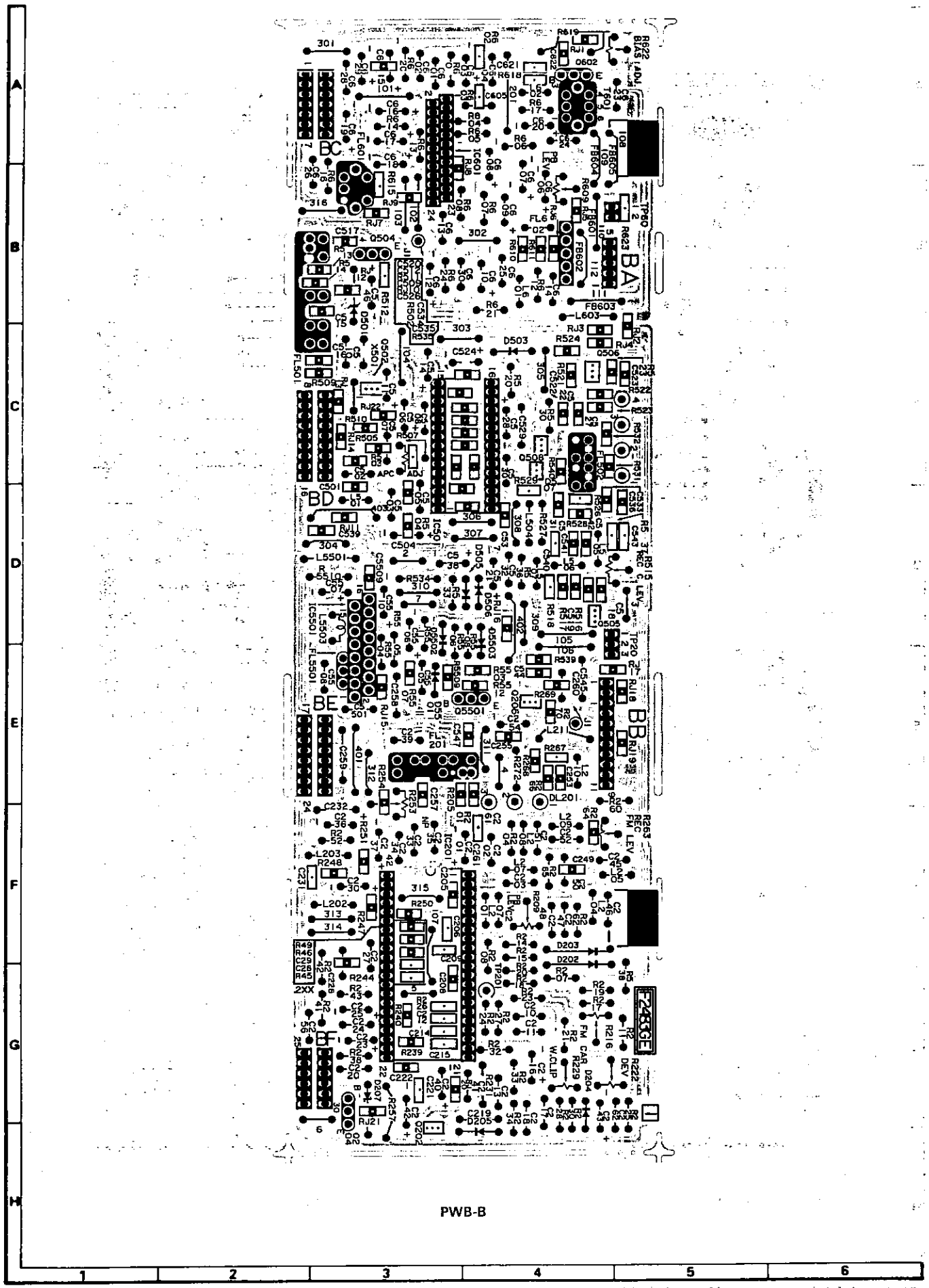


RF CONVERTER

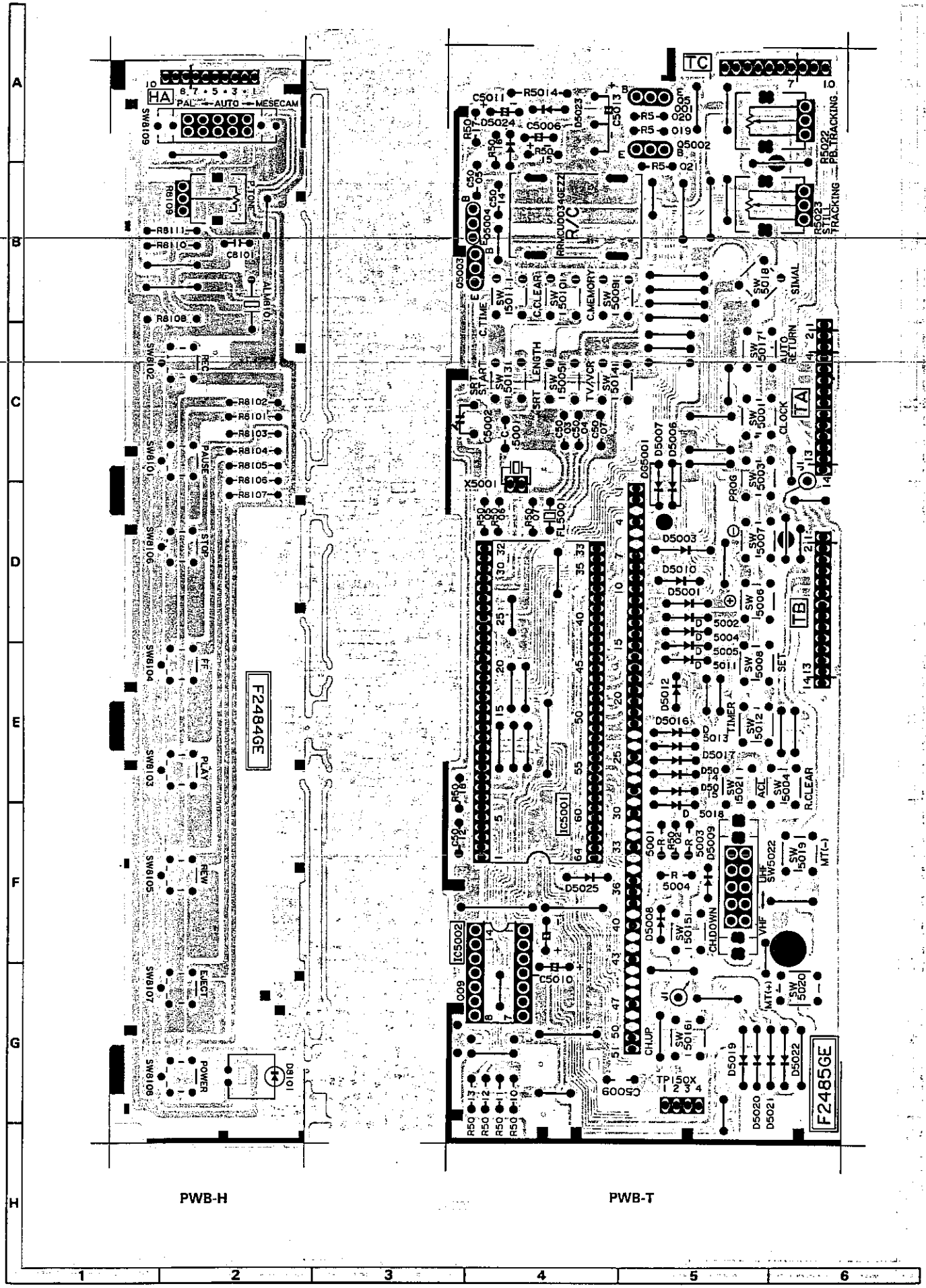




PWB-A



PWB-B


PWB-H
PWB-T
F2484GE
F2485GE
HA
TC
TA
TB
PAL — AUTO — MESECAM
R/C
PLAY
REW
FF
STOP
PAUSE
REC
EJECT
POWER
CH.UP
CH.DOWN
TIMER
SET
CLOCK
PROG
R.CLEAR
C.CLEAR
C.MEMORY
C.TIME
SRT START
SRT LENGTH
TV/VCR
AUTO RETURN
SIMUL
TRACKING
PB TRACKING
STILL
VHF
UHF
MT(+)
MT(-)
IC5001
IC5002
X5001
FL5001
D5001
D5002
D5003
D5004
D5005
D5006
D5007
D5008
D5009
D5010
D5011
D5012
D5013
D5014
D5015
D5016
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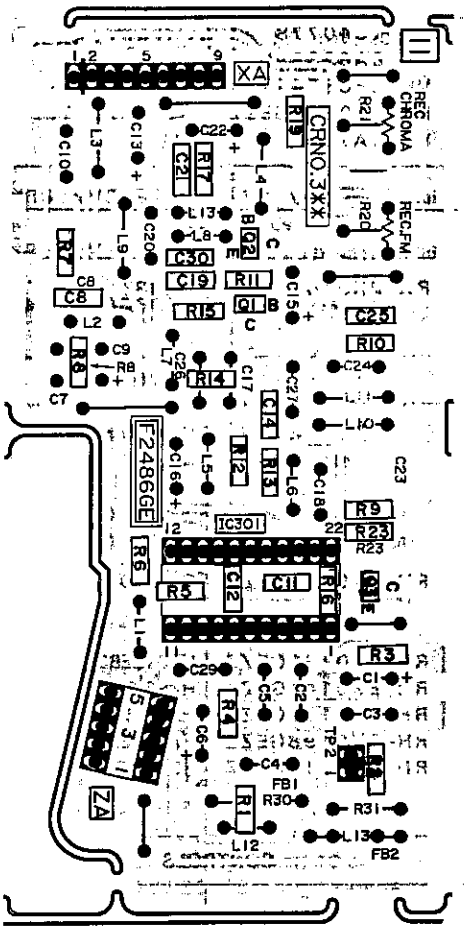
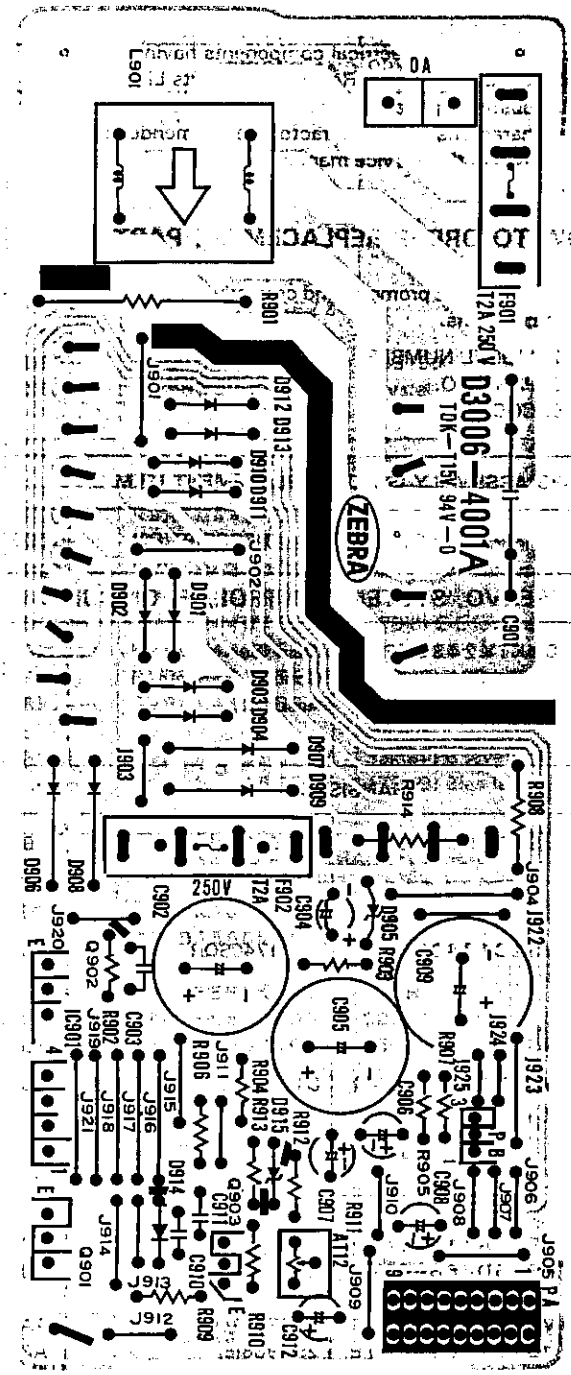
D5025
D8101
SW5022
TP150X



PWB-X



PWB-P

PARTS LIST

PARTS REPLACEMENT

Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by ⚠ in the Replacement Parts Lists.
The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER 2. REF. NO.
3. PART NO. 4. DESCRIPTION
5. CODE

PWB ASSEMBLY IS NOT REPLACEMENT ITEM

REF.NO.	PART NO.	DESCRIPTION	CODE
MAIN (SERVO, SYSTEM-CONTROL, IF) CIRCUIT			
PWB-A	DUNTK2482HE55	Main (Servo, System-Control, IF) Board Assembly	—
TRANSISTORS			
Q702, 705, 802, 4401	VS2SA933SQR1E	2SA933SQR	AB
Q704, 808, 809, 810, 957	VS2C1740SQR1E	2SC1740SQR	AC
Q801, 954, 956, 1556, 5551, 6601	VSDTC144ES/-1	DTC144ES	AB
Q803	VSDTA114ES/-1	DTA114ES	AB
Q804, 805	VS2SD468-C/-1	2SD468	AD
Q807	VS2SC2001LK-1	2SC2001LK	AA
Q951	VS2SA988///1E	2SA988(E)	AB
Q952	VS2SA1013//1E	2SA1013	AD
Q953, 955	VS2SB1117KU1E	2SB1117KU	AE
Q1451	VS2SC383-WT-1	2SC383	AE
Q6602, 6603	VS2SD655-DE1E	2SD655	AC
Q6604	VSDTA144ES/-1	DTA144ES	AB
Q8801, 8804	VS2SA950-Y/1E	2SA950Y	AD
Q8802, 8803	VSDTA124ES/-1	DTA124ES	AB
Q8805	VS2SA952LK/-1	2SA952(LK)	AB

REF. NO.	PART NO.	DESCRIPTION	CODE
INTEGRATED CIRCUITS			
IC701	RH-iX0322GEZZ		AS
IC702	VHiLA7116//-1		AH
IC703	VHiBA15218N-1		AD
IC801	RH-iX0329GEZZ		AW
IC802	VHiTC4077BP-1		AD
IC803	VHiBA6238AU1E		AH
IC951	VHiUPC574JT-1		AC
IC1451	RH-iX0203GEZZ		AE
IC2201	VHiBA7021//-1		AE
DIODES			
D701	RH-DX0142CEZZ	1SS133	AA
705, 801, 802, 806			
809, 814, 956, 957			
D803, 951, 954	RH-DX0052GEZZ	ERA1502	AB
D805	RH-EX0163GEZZ	HZS12EB3	AA
D952	RH-EX0141GEZZ	HZS6.2EB3	AB
D953	RH-EX0136GEZZ	HZS5.6EB1	AA
D955	RH-EX0198GEZZ	HZS33EB3	AB
D959	RH-EX0010GEZZ	RD5.6EB2	AB
CONTROLS			
R707, 769	RVR-M4421GEZZ	100k(B) Tracking MM preset 100k(B) Still/Slow tracking preset	AB
R720	RVR-M4198GEZZ	100k(B) Phase generator adj.	AD
R836	RVR-B4336GEZZ	100k(B) False vertical sync adj.	AD
COILS AND FILTER			
L1451	VP-DF120K0000	12μH	AB
L2201, 4401	VP-DF221K0000	220μH	AB
FL801	RFiLC0039GEZZ	Filter	AE
CAPACITORS			
C715	VCEAEA0JW107M	100μF, 6.3V, 20%, Electrolytic	AB
C716, 723, 725, 818, 819, 2201	VCE9EA1HW105M	1μF, 50V, 20%, Electrolytic (N.P.)	AC

REF.NO.	PART NO.	DESCRIPTION	CODE
C951	VCEAGA1JW107M	100μF, 63V, 20%, Electrolytic	AC
C1564, 4401	VCEAEA1CW107M	100μF, 16V, 20%, Electrolytic	AC
C4403	VCEAGA0JW477M	470μF, 6.3V, 20%, Electrolytic	AB
C5551	VCEAEA1AW107M	100μF, 10V, 20%, Electrolytic	AB
RESISTORS			
R856	VRS-VV3DB181J	180 ohm, 2W, Metal Oxide	AA
R857	VRS-VV3DB221J	220 ohm, 2W, Metal Oxide	AA
PR951	RMPTP0006GEZZ	Fusible resistor	AE
MISCELLANEOUS			
	RUNTK0444GEZZ	IF pack	AX
	RCNVR0010GEZZ	RF converter	AZ
	VTUöF4EC-721/	Tuner	BB
	QJAKE0055GEZZ	Jack, Audio in/out	AD
	QJAKZ0009GEZZ	Jack, Video in/out	AH
	QPLGN0228TAZZ	Plug, 2 pin (TP2201, TP2202)	AB
	QPLGN0428TAZZ	Plug, 4 pin (TP701—TP704)	AB
	QPLGN0611REZZ	Plug, 6 pin (AC)	AD
	QPLGN0679GEZZ	Plug, 6 pin (AW)	AB
	QPLGN0779GEZZ	Plug, 7 pin (AZ)	AB
	QPLGN0762GE09	Plug, 7 pin (AD)	AB
	QPLGN0879GEZZ	Plug, 8 pin (AX)	AB
	QPLGN0979GEZZ	Plug, 9 pin (AY)	AC
	QSöCN0822REZZ	Socket, 8 pin (AI)	AC
	QSöCN1013REZZ	Socket, 10 pin (AB)	AD
	QSöCZ1217GEZZ	Socket, 12 pin (AJ)	AE
	QSöCZ1317GEZZ	Socket, 13 pin (AH)	AE
	QSöCN0713REZZ	Socket, 7 pin (AE)	AC
Y/C AUDIO CIRCUIT			
PWB-B	DUNTK2483TM52	Y/C, Audio Board Assembly	—
TRANSISTORS			
Q204	VS2SD471-KL-1	2SD471	AD
Q205, 502, 505, 507, 508	VS2SC1623L51E	2SC1623	AB
Q504	VS2SC2001LK-1	2SC2001LK	AA
Q506	VS2SA812-M51E	2SA812	AC
Q602	VS2SD592ARS-1	2SD592	AC
Q5501	VS2C1740SQR1E	2SC1740SQR	AC
INTEGRATED CIRCUITS			
IC201	VHi HA118026NT		AT
IC501	VHi TA8644N/-1		AP
IC601	VHi BA7751ALS1		AG
IC602	VHi BA7755//-1		AD
IC5501	VHi BA7007//-1		AM
DIODES AND CRYSTAL			
D203, 204, 505, 506, 5501, 5502, 5503	VHD1SS119//-1	1SS119	AB
D207, 501	RH-EX0374GEZZ		AA
D503	VHD1SS198//-1	1SS198	AB
X501	RCRSB0002CEZZ	Crystal	AM
CONTROLS			
R209	RVR-M4408GEZZ	680(B) PB level adj.	AB
R216	RVR-M4361GEZZ	680(B) FM carrier adj.	AB
R222	RVR-M4370GEZZ	6.8k(B) Deviation adj.	AB
R229	RVR-M4411GEZZ	2.2k(B) White clip adj.	AB
R253	RVR-M4407GEZZ	470(B) E-E level adj.	AB
R263	RVR-M4430GEZZ	1k(B) REC FM level adj.	AB
R507	RVR-M4380GEZZ	100k(B) APC adj.	AC
R515	RVR-M4432GEZZ	2.2k(B) REC chroma level adj.	AB
R609	RVR-M4439GEZZ	33k(B) PB level adj.	AB
R622	RVR-M4446GEZZ	470k(B) Bias level adj.	AB
COILS AND TRANSFORMER			
L201	VP-MK101K0000	100μH	AB
L202, 212	VP-DF560K0000	56μH	AB
L203	VP-XF8R2K0000	8.2μH	AB
L204	VP-XF680K0000	68μH	AB
L205	VP-XF150K0000	15μH	AB
L208, 210	VP-XF151K0000	150μH	AB
L209,	VP-XF820K0000	82μH	AB
L211, 603, 5501	VP-DF221K0000	220μH	AB
L502	VP-MK180J0000	18μH	AB
L504	VP-XF390K0000	39μH	AB
L505, 506	VP-XF221K0000	220μH	AB
L507	VP-MK561K0000	560μH	AB
L601	VP-YF562J0000	5.6mH	AC
L602	VP-YF471K0000	470μH	AC
L5503	VP-YF153J0000	15mH	AC
FL201	RMPTD0254GEZZ	Filter	AG
FL501	RMPTD0239GEZZ	Filter	AG
FL502	RMPTD0256GEZZ	Filter	AF
FL601	RCiLF0076GEZZ	Filter	AF
FL602	RCiLi0060GEZZ	Filter	AD
FL5501	RFiLC0029TAZZ	Filter	AD
DL201	RCiLZ0185GEZZ	Delay line	AN
DL501	RCiLZ0190GEZZ	Delay line	AT
T601	RTRNH0046GEZZ	Transformer	AE

REF.NO.	PART NO.	DESCRIPTION	CODE
CAPACITORS			
C235	VCE9EA1EW475M	4.7μF, 25V, 20%, Electrolytic (N.P.)	AC
C240	VCEAEA1AW107M	100μF, 10V, 20%, Electrolytic	AB
C609	VCEAGA1CW107M	100μF, 16V, 20%, Electrolytic	AB
C624	VCQPKA2AA153J	.015μF, 100V, 5%, Polypro film	AB
MISCELLANEOUS			
	QPLGN0229TAZZ	Plug, 2 pin (TP601, TP602)	AB
	QPLGN0329TAZZ	Plug, 3 pin (TP201—TP203)	AB
	QPLGN0562GE09	Plug, 5 pin (BA)	AB
	QPLGN0778GEZZ	Plug, 7 pin (BB)	AC
	QSôCN0679GEZZ	Socket, 6 pin (BF)	AC
	QSôCN0779GEZZ	Socket, 7 pin (BC)	AC
	QSôCN0879GEZZ	Socket, 8 pin (BE)	AC
	QSôCN0979GEZZ	Socket, 9 pin (BD)	AB
OPERATION CIRCUIT			
PWB-H	DUNTK2484HE00	Operation Board Assembly	—
DIODE			
D8101	RH-PX0142GEZZ	LED	AB
CONTROL			
R8109	RVR-B4295GEZZ	20k(B) Picture tone adj.	AD
MISCELLANEOUS			
ALM8101	RALMB0010GEZZ	Alarm	AD
SW8101, 8102, 8103, 8104, 8105, 8106, 8107, 8108	QSW-K0052GEZZ	Switch, Pause Switch, Record Switch, Play Switch, Fast-forward Switch, Rewind Switch, Stop Switch, Eject Switch, Power	AB
SW8109	QSW-S0165GEZZ	Switch, Colour mode	AC
	QPLGZ0723GEZZ	Plug, 7 pin (HA)	AC
TIMER CIRCUIT			
PWB-T	DUNTK2485HE55	Timer Board Assembly	—
TRANSISTORS			
Q5001, 5004	VS2SA937-Q/-1	2SA937	AC
Q5002	VS2SC2021-Q-1	2SC2021	AB
Q5003	VSDTC144F//-1	DTC144F	AB

REF. NO.	PART NO.	DESCRIPTION	CODE
INTEGRATED CIRCUITS			
IC5001	RH-iX0328GEZZ		AU
IC5002	RH-iX0439CEZZ		AQ
DIODES AND CRYSTAL			
D5001 — 5005, 5008, 5009, 5011, 5014, 5019, 5022 — 5024	RH-DX0053GEZZ		AA
X5001	RCRSB0006GEZZ	Crystal	AK
CONTROL			
R5022, 5023	RVR-B4296GEZZ	200k(B) PB tracking adj. 200k(B) Still tracking adj.	AD
FILTER			
FL5001	RFiLC0039GEZZ	Filter	AE
CAPACITORS			
C5002	RTô-H1005AEZZ	Oscillation adj.	AC
C5013	RC-EZ0110GEZZ	.047F, 5.5V, Electrolytic	AG
MISCELLANEOUS			
DG5001	VVKCPR2266/-1	Display tube	AW
	RRMCU0034GEZZ	Remote control receiver	AM
SW5001, 5003, 5004, 5005, 5006, 5007, 5008, 5009, 5010, 5011, 5012, 5013, 5014, 5015, 5016, 5017, 5019, 5020, 5021	QSW-K0052GEZZ	Switch, Clock Switch, Program Switch, Program clear Switch, SRT length Switch, (+) Switch, (−) Switch, Set Switch, Counter memory Switch, Counter clear Switch, Counter/Timer Switch, Timer Switch, SRT start Switch, TV/VCR Switch, Channel down Switch, Channel up Switch, Record return Switch, MT (−) Switch, MT (+) Switch, ACL	AB
SW5022	QSW-S0164GEZZ	Switch, VHF/UHF	AC
	QPLGN0428TAZZ	Plug, 4 pin (TP1501—TP1504)	AB
	QPLGZ0723GEZZ	Plug, 7 pin (TC)	AC
	QPLGZ1222GEZZ	Plug, 12 pin (TB)	AC
	QPLGZ1322GEZZ	Plug, 13 pin (TA)	AE

REF.NO.	PART NO.	DESCRIPTION	CODE
HEAD AMP CIRCUIT			
PWB-X	DUNTK2486TM50	Head Amp Board Assembly	—
TRANSISTORS			
Q301	VS2SC2059KN1E	2SC2059K	AC
Q302	VS2SC1623L51E	2SC1623L	AB
Q303	VSDTC144EK/-1	DTC144EK	AB
INTEGRATED CIRCUIT			
IC301	VHiBA7252S/-1		AH
COILS			
L303	VP-MK101K0000	100μH	AB
L304	VP-XF680K0000	68μH	AB
L305	VP-XF330K0000	33μH	AB
L306	VP-XF270K0000	27μH	AB
L307	VP-XF220K0000	22μH	AB
L309	VP-XF221K0000	220μH	AB
MISCELLANEOUS			
	QPLGN0229TAZZ	Plug, 2 pin (TP301, TP302)	AB
	QPLGN0780GEZZ	Plug, 7 pin (XA)	AC
	QSôCN0596GEZZ	Socket, 5 pin (ZA)	AB
POWER CIRCUIT			
PWB-P	RDENT0220GEZZ	Power Board Assembly	—
TRANSISTOR			
Q901	95KUAD0088AC	2SD1565	AF
INTEGRATED CIRCUIT			
IC901	95KUCB0029AZ	PQ09R05	AK
DIODES			
⚠D901	95KUBC0112AZ	11E1	AB
⚠ 904, ⚠ 906 ⚠ 909 D905	95KUBD0430AZ	RD18ESB	AB
CAPACITORS			
C902	95KUGAE222EP	2200μF, 35V, Electrolytic	AG
C905	95KUGAD222BU	2200μF, 25V, Electrolytic	AG

REF. NO.	PART NO.	DESCRIPTION	CODE
RESISTORS			
⚠R901	95KUEZ0085ZZ	12M ohm, 1/2W, Solid	AE
⚠R914	95KUEZ0204ZZ	.3 ohm, 1/4W, Fusible resistor	AC
TRANSFORMER			
⚠T901	95K116030356	PT2336	AY
MISCELLANEOUS			
⚠	QACCV2024GEZZ	AC cord, AC220V/50Hz	AM
⚠F901,	95KPJC0178ZZ	Fuse, T2A 250V	AD
⚠ 902	95KPZZ0073ZZ	Fuse holder	AA
	95KPKZ0194ZZ	Plug, 3 pin (OA)	AC
	95KPKZ0528ZZ	Plug, 8 pin (PA)	AD
R/C TRANSMITTER CIRCUIT			
	RCMCG0288GESA	Remote Control Unit	AX
TRANSISTORS			
Q3001	VS2SC2458//-A	2SC2458Y	AB
Q3002	VS2SC2120Y/-A	2SC2120Y	AC
INTEGRATED CIRCUIT			
IC3001	RH-iX0478PAZZ	LR3714M	AM
DIODES AND OTHER PARTS			
D3001	RH-PX0068PAZZ	GL-521	AD
	or		
	RH-PX0142PAZZ	SLR-938C	AC
	or		
	RH-PX0144PAZZ	GL-524	AC
CF3001	RFiLF0010PAZZ	KBR455BTL	AE
	or		
	RFiLF0027PAZZ	CSB455EGB	AD
R/C CABINET PARTS			
	GCABA0093AASA	Upper cabinet	AK
	GCABB0164AASA	Bottom cabinet	AC
	GCôVH0056PASA	Battery cover	AB
	PFiLW0103PASA	Infrared filter	AC
	MSPRP0330PASA	Rubber key	AG
	QTANZ0161PAFN	Battery terminal	AC
	QTANZ0162PAZZ	Battery terminal	AA
	QTANZ0163PAZZ	Battery terminal	AB
	HPNLH0410PASA	Indication plate	AE
	XYBSF26P08000	Screw	AA

REF.NO.	PART NO.	DESCRIPTION	CODE
	THE OTHER PARTS		
	QCNW-2304GEZZ	Connecting cord	AL
	TINS-0990GEZZ	Operation manual	AE
	MECHANISM CHASSIS PARTS		
1	RH-PX0090GE01	LED sensor	AH
3	DDRMU0002HE17	Upper drum ass'y	BM
4	PGi DC0035GEFW	Drum base	AM
5	LANGF9264GEZZ	Pinch roller link plate ass'y	AK
6	DDRML0008HE04	Lower drum ass'y	BD
7	LANGF9255GEZZ	Mechanism control braket	AL
11	LBNDK1001GEZZ	Tension band ass'y	AH
12	———	Main chassis	—
13	LCHSS0011GEZZ	Guide plate ass'y	AG
14	LDAi H3013GEZZ	Audio/Control head plate	AD
15	LHLDZ1435GEZZ	Loading motor holder	AC
17	LHLDP1045GEZZ	Cassette LED holder	AE
18	LPôLM0022GEZZ	Pole base A ass'y	AM
19	LPôLM0023GEZZ	Pole base B ass'y	AM
20	MARMM0052GEZZ	Loading arm A ass'y	AE
21	MARMM0053GEZZ	Loading arm B ass'y	AE
22	MARMM0054GEZZ	Tension arm ass'y	AE
23	MARMP0035GEZZ	Full erase head arm	AB
24	MLEVF0229GEZZ	Pinch roller lever ass'y	AH
25	MLEVF0225GEZZ	Brake drive lever ass'y	AF
27	MLEVP0083GEZZ	Auxiliary brake lever	AA
28	MLEVP0084GEZZ	Torque change lever	AA
29	MLEVP0085GEZZ	Take-up brake lever	AC
30	MLEVP0086GEZZ	Supply brake lever	AC
31	MLEVP0087GEZZ	Tension adjusting lever	AC
32	MLEVP0123GEZZ	Tension release lever	AC
33	MSLiF0023GEZZ	Shifter ass'y (A)	AE
34	MSLiF0024GEZZ	Shifter ass'y (B)	AD
35	MSPRC0006GEFJ	Audio/Control head spring	AA
37	MSPRC0084GEFJ	Audio/Control head arm spring	AA
39	MSPRC0086GEFJ	Brake lock spring	AA
40	MSPRT0216GEFJ	Pinch pressure spring	AB
41	MSPRT0217GEFJ	Full erase head arm spring	AA
42	MSPRT0218GEFJ	Tension arm spring	AA
43	MSPRT0241GEFJ	Auxiliary brake spring	AA
44	MSPRT0220GEFJ	Loading gear reciprocating spring	AA
45	MSPRT0221GEFJ	Main brake spring	AA
48	NBLTK0039GE00	Loading belt	AB
51	NDAi V1032GEZZ	Supply reel disk ass'y	AF
52	NDAi V1038GEZZ	Take-up reel disk ass'y	AF
54	NGERH1072GEZZ	Relay gear (B)	AB
55	NGERH1109GEZZ	Brake cam	AC
56	NGERH1108GEZZ	Master cam	AC
57	NGERH1075GEZZ	Loading gear (A) ass'y	AD
58	NGERH1076GEZZ	Loading gear (B) ass'y	AC
59	NGERH3032GEZZ	Segment gear ass'y	AE
60	NRôLM0016GEFW	Segment gear roller	AA
61	NPLYV0036GEZZ	Loading motor pulley	AB
63	NPLYV0102GEZZ	Loading block ass'y	AL
64	NPLYV0111GEZZ	Reel drive unit	AR
65	NRôLP0046GEZZ	Supply impedance roller	AH
66	NRôLP0047GEZZ	Guide roller ass'y	AH
67	NRôLR0013GEZZ	Pinch roller ass'y	AN
68	NSFTL0215GEFW	Supply impedance sub shaft	AB
69	NSFTZ0026GEFD	Brake lock shaft	AA
73	PGi DP0015GEFW	Retaining guide	AC
75	PGi DH0029GEZZ	Supply impedance flange	AB
78	QBRSK0017GEZZ	Drum ground ass'y	AD
80	QPLGN0229TAZZ	Plug, 2 pin (NL)	AB
82	QPLGN0278GEZZ	Plug, 2 pin (NE)	AA
83	QPLGN0480GEZZ	Plug, 4 pin (NF)	AB
84	QPLGN0880GEZZ	Plug, 8 pin (NT)	AC
88	QPWBF2576GEZZ	Reel sensor PWB	—
89	QPWBF2583GEZZ	Loading motor/Dew sensor PWB	—
90	QPWBF2582GEZZ	Full erase head PWB	—
91	QSW-F0024GEZZ	Shifter switch	AD
92	QSW-R0019GEZZ	Cam switch	AM
93	RDTCH0018GEZZ	Dew sensor	AG
95	RH-PX0099GEZZ	Cassette LED	AG
96	RHEDT0019GEZZ	Full erase head ass'y	AP
97	RHEDU0057GEZZ	A/C head ass'y	AU
98	VHi M5F7805L-1	Transistor	AE
99	RMôTM1042GEZZ	Loading motor	AM
100	RMôTP1084GEZZ	DD motor ass'y	BB
101	RMôTN2001GEZZ	Capstan DD motor	BH
102	RPLU-0075GEZZ	Brake solenoid	AG
104	VCKYAT1HD102M	1000pF, 20%, 50V, Disc	AA
105	VRD-RA2EE473J	47k ohm, 5%, 1/4W, Carbon	AA
106	VRD-RA2EE222J	2.2k ohm, 5%, 1/4W, Carbon	AA
107	VRD-RA2EE221J	220 ohm, 5%, 1/4W, Carbon	AA
108	LX-NZ3019GEZZ	Adjusting nut	AB
109	MLEVC0020GEZZ	Reverse guide lever	AG
110	MSPRC0088GEFJ	Reverse guide spring	AA
112	MLEVP0101GEZZ	Universal brake lever	AB
114	MSPRT0240GEFJ	Universal brake spring	AA
115	PSPAB0022GEFW	Supply roller spacer	AB
116	VRD-RA2EE122J	1.2k ohm, 5%, 1/4W, Carbon	AA
117	VRD-RA2EE152J	1.5k ohm, 5%, 1/4W, Carbon	AA
118	QSôCN0712REZZ	Socket, 7 pin (NA)	AC
120	RPLU-0080GEZZ	DD brake solenoid	AK
121	MLEVP0102GEZZ	DD brake lever	AB
122	LANGF9290GEFJ	DD brake fixing angle	AD
123	MSPRC0116GEFJ	Spring, for release	AA
124	MSPRT0239GEFJ	Spring, for DD brake lever	AA
128	PSPAB0019GEFW	Spacer, for DD solenoid	AC
129	LANGT9105GEFW	Heater braket	AC
	CASSETTE HOUSING CONTROL PARTS		
	CHLDX3039GE98	Cassette housing ass'y (Excludes the cassette cover)	BB
1	HDECQ0329GESA	Cassette cover	AH
2	LANGF9251GEFW	Upper plate	AG
3	LANGF9305GEZZ	Cassette motor bracket ass'y	AC
4	LHLDX1005GE00	Cassette housing frame (Right)	AK
5	LHLDX1006GE00	Cassette housing frame (Left)	AH
6	LHLDX3029GEZZ	Slider ass'y	AL
6-1	LHLDX1003GE00	Slider holder (Right)	AG
6-2	LHLDX1004GE00	Slider holder (Left)	AC
6-3	LHLDX3029GEFW	Slider	AE

REF.NO.	PART NO.	DESCRIPTION	CODE
6-4	MARMP0028GEZZ	Lock release ass'y	AD
6-5	MSPRP0097GEFJ	Cassette spring	AA
7	MARMM0051GEFW	Drive washer	AB
8	MARMP0029GEZZ	Drive arm (Right)	AB
9	MARMP0030GEZZ	Drive arm (Left)	AB
10	MARMP0031GEZZ	Cassette cover arm	AA
11	MLEVP0080GEZZ	Timing lever	AA
12	MLEVP0081GEZZ	Cassette cover open lever	AB
13	MSPRD0065GEFJ	Reciprocating spring	AA
14	MSPRD0066GEFJ	Cassette cover open lever spring	AA
15	MSPRT0215GEFJ	Drive spring	AA
16	NGERH1093GEZZ	Drive gear (Right)	AB
17	NGERH1070GEZZ	Drive gear (Left)	AB
18	NGERH1071GEZZ	Phase gear	AA
19	NGERW1018GEZZ	Worm gear	AB
20	NGERW1026GEZZ	Worm wheel gear	AC
21	NPLYV0100GEZZ	Cassette motor pulley	AA
22	NSFTL0442GEFD	Main shaft	AD
23	PGiDM0042GE00	Down guide	AF
24	PGUMM0028GEZZ	Noise absorber rubber	AB
26	QSōCN0921REZZ	Socket, 9 pin (MA)	AC
27	QPWBF2447GEZZ	Cassette relay PWB	AC
28	QPWBF1553GEZZ	End sensor PWB	AB
29	QSW-F0021GEZZ	Cassette switch	AD
30	QSW-F0022GEZZ	Cassette mode switch	AE
31	QSW-F0023GEZZ	Cassette erase protection switch	AD
32	VRD-RA2BE122J	1.2k ohm, 1/8W, 5%, Carbon	AA
33	RH-PX0053GEZZ	Photo-transistor	AF
34	RMōTM1040GEZZ	Cassette loading motor	AN
35	MSPRD0068GEFJ	Cassette cover spring	AA
36	VRD-RA2EE153J	15k ohm, 1/4W, 5%, Carbon	AA
37	VS2SA937-Q/-1	Start/End sensor amp.	AC
38	VCTYPA1EX473M	.047μF, 25V, 20%, Electrolytic	AA
39	VRD-RA2EE223J	22k ohm, 1/4W, 5%, Carbon	AA
40	VRD-RA2BE152J	1.5k ohm, 1/8W, 5%, Carbon	AA
41	LX-HZ3037GEFD	Screw (B tight 2x6)	AA
42	LX-WZ1020GE00	Cut washer 4.2W-7.0-0.5	AA

SCREWS, NUTS, WASHERS, AND WIRE CLAMP

301	LX-BZ3018GEZZ	A/C head screw	AA
302	LX-BZ3039GEFN	Screw W3P+9S	AA
303	XBPSD26P14J00	Screw 2.6P+14S	AA
304	LX-BZ3049GEFD	Screw WSW3P+10S	AA
305	LX-HZ3002GEFD	Screw 3x8	AA
306	LX-HZ3008GEFD	Screw S3P+8S+W	AA
307	LX-HZ3026GEFD	Screw BTN2x8	AA
308	LX-HZ3027GEFD	Screw BTN3x8	AA
309	LX-NZ3013GEFW	Adjusting Nut	AA
310	LX-NZ3031GEFW	Adjusting Nut	AA
311	LX-NZ3016GEFD	Adjusting Nut	AB
312	LX-WZ1001GE00	Washer 3.2W-8-0.5	AA
313	LX-WZ1003GE00	Washer 2.1W-5-0.5	AA
315	LX-WZ1006GE00	Washer 2.6W-5.4-0.5	AA
317	LX-WZ1015GE00	Washer 3.6W-7.2-0.5	AA
318	LX-XZ3001GEFP	Fixing screw M2x3	AC
321	XBPSD20P03000	Screw 2P+3S	AA
322	XBPSD26P04J00	Screw SW2.6+4S	AA
323	XBPSD30P04J00	Screw SW3P+4S	AA
325	XBPSD30P05J00	Screw SW3P+5S	AA
327	XBPSD30P08J00	Screw SW3P+8S	AA
328	XBPSD30P08000	Screw 3P+8S	AA
331	XHPSD30P06WS0	Screw C3P+6S	AA
332	XHPSD30P08WS0	Screw C3P+8S	AA
334	XHPS330P06WS0	Screw (Red)	AA
337	XJPSD30P06WS0	Screw C3P+6S	AA
338	XNESD30-02000	Nut	AA
339	XRESJ30-06000	E-ring	AA
342	XWHJZ31-05054	Washer 3.1W-5.4-0.5	AA
342	XWHJZ31-01054	Washer 3.1W-5.4-0.13	AA
342	LX-WZ1017GE00	Washer 3.1W-5.4-0.2	AA
342	LX-WZ1018GE00	Washer 3.1W-5.4-0.3	AA
342	LX-WZ1019GE00	Washer 3.1W-5.4-0.4	AA
350	LX-BZ3065GEFD	Screw	AA
352	LX-HZ3036GEFD	Screw C2.6P+5.5S	AA
353	XRESJ12P03000	E Ring	AA
354	XBPSD30P06J00	Screw SW3P+6S	AA
355	XHPSD26P04000	Screw 2.6P+4S	AA
356	XBPSD20P05J00	Screw 2W2P+5S	AA

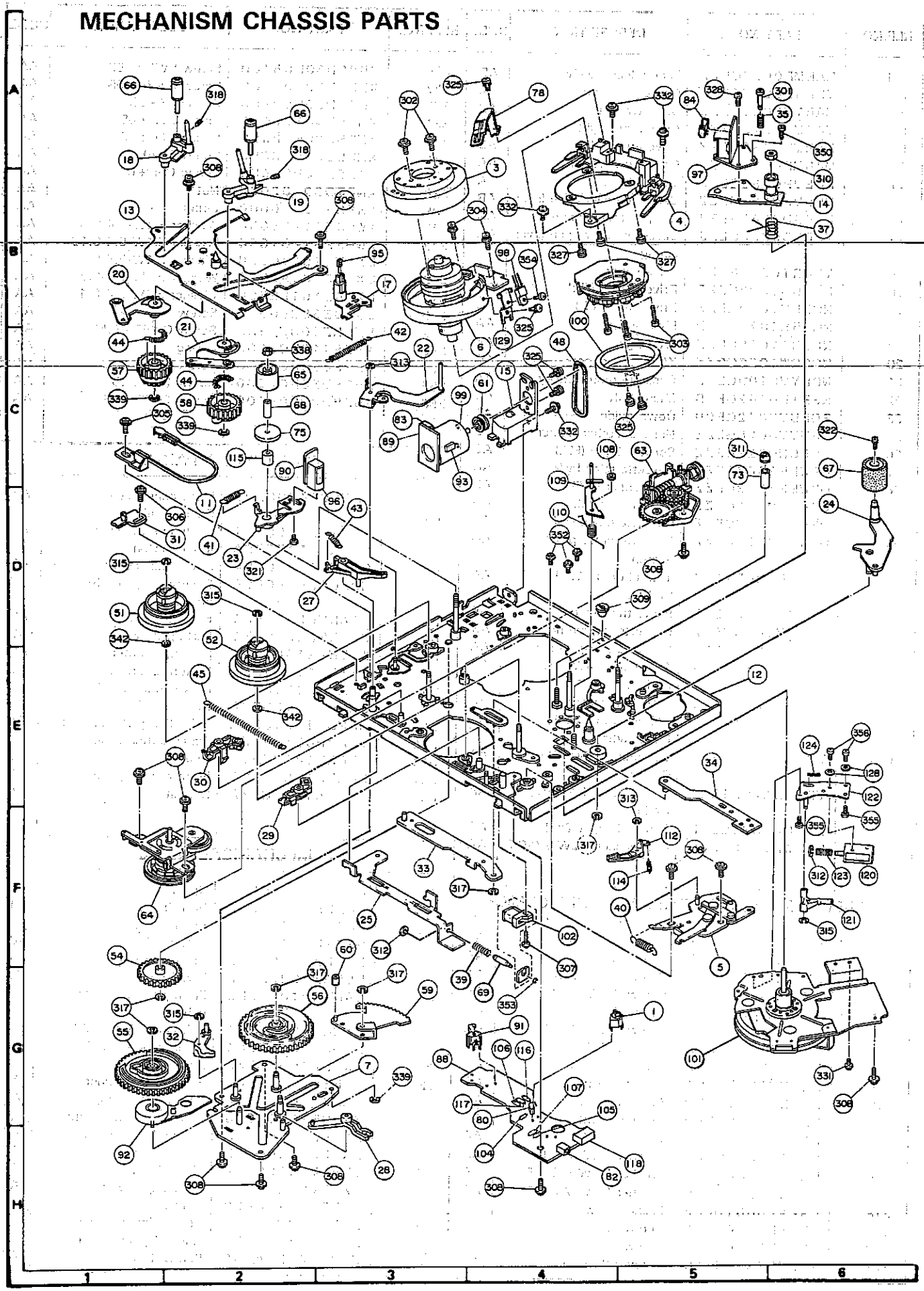
FRONT PANEL PARTS

1	CPNLC1480GE02	Front panel ass'y	AY
1-1	————	Front panel	—
1-2	CBTN-2145GE01	Mode button ass'y	AF
1-2-1	JBTN-2145GESA	Mode button	AB
1-2-2	GCōVA1435GESA	Power LED cover	AC
1-2-3	HDECQ0459GESA	Decoration plate, Record button	AC
1-3	QEARP0234GEFW	Earth plate A	AC
1-4	QEARP0236GEFW	Earth plate B	AC
1-5	JBTN-2148GESA	Button, Counter	AC
1-6	JBTN-2147GESA	Button, Channel	AC
1-7	TCAUH3154GEZZ	Dew caution label	AB
1-8	LHLDS1010GEZZ	Door holder	AA
1-9	HiNDP1284GESA	Indication plate (in door)	AF
1-10	TLABH0363GEZZ	Timer setting label	AC
1-11	GDōRF1422GESA	Door	AE
1-12	HiNDP1283GESA	Front display plate	AG
1-13	GCōVA1425GEZZ	R/C filter	AC

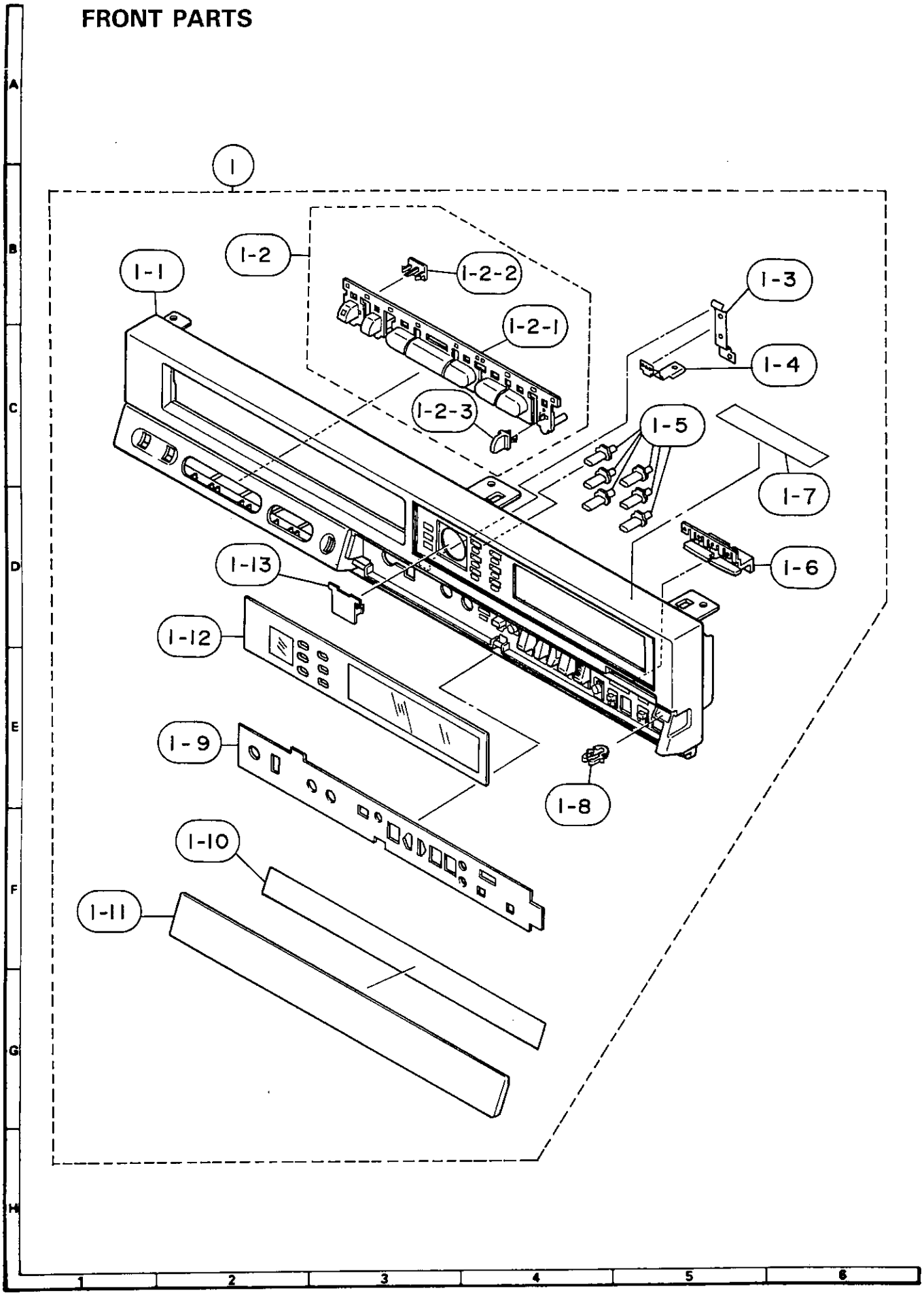
MECHANICAL PARTS

1	GCABA3035GES3	Upper cabinet	AT
2	GCABB1064GEZZ	Main frame	AU
3	GCōVA1456GEZZ	Antenna terminal plate	AF
4	GBDYU3043GEZZ	Bottom plate	AH
5	LHLDZ1540GEZZ	Display holder	AC
6	PSPAN0025GEZZ	PWB spacer	AA
7	LANGK0106GEFW	Earth plate C, Upper cabinet	AB
9	LANGF7045GEFW	Left angle, Main PWB	AD
10	LANGF7046GEFW	Right angle, Main PWB	AD
11	LX-LZ1001GEZZ	Push rivet	AA
12	XEBSD30P12000	Screw, Main/Tuner	AA
13	XHPSD30P06WS0	Screw, Head amp.	AA
14	XJBSF30P14000	Screw, Bottom cabinet	AA
15	LX-HZ3030GEFF	Screw, Upper cabinet	AA
16	LX-HZ3040GEFF	Screw, Upper cabinet	AA
17	TLABM1420GEZZ	Model label	AB
18	PZETV0265GEZZ	Insulator, Power	AG
19	LHLDF1072GE00	Holder	AB
20	LANGK0104GEFW	Angle, Upper cabinet	AB
21	LANGK0105GEFW	Angle, Upper cabinet	AC
23	XEBSD40P16000	Screw, Power	AA

MECHANISM CHASSIS PARTS



FRONT PARTS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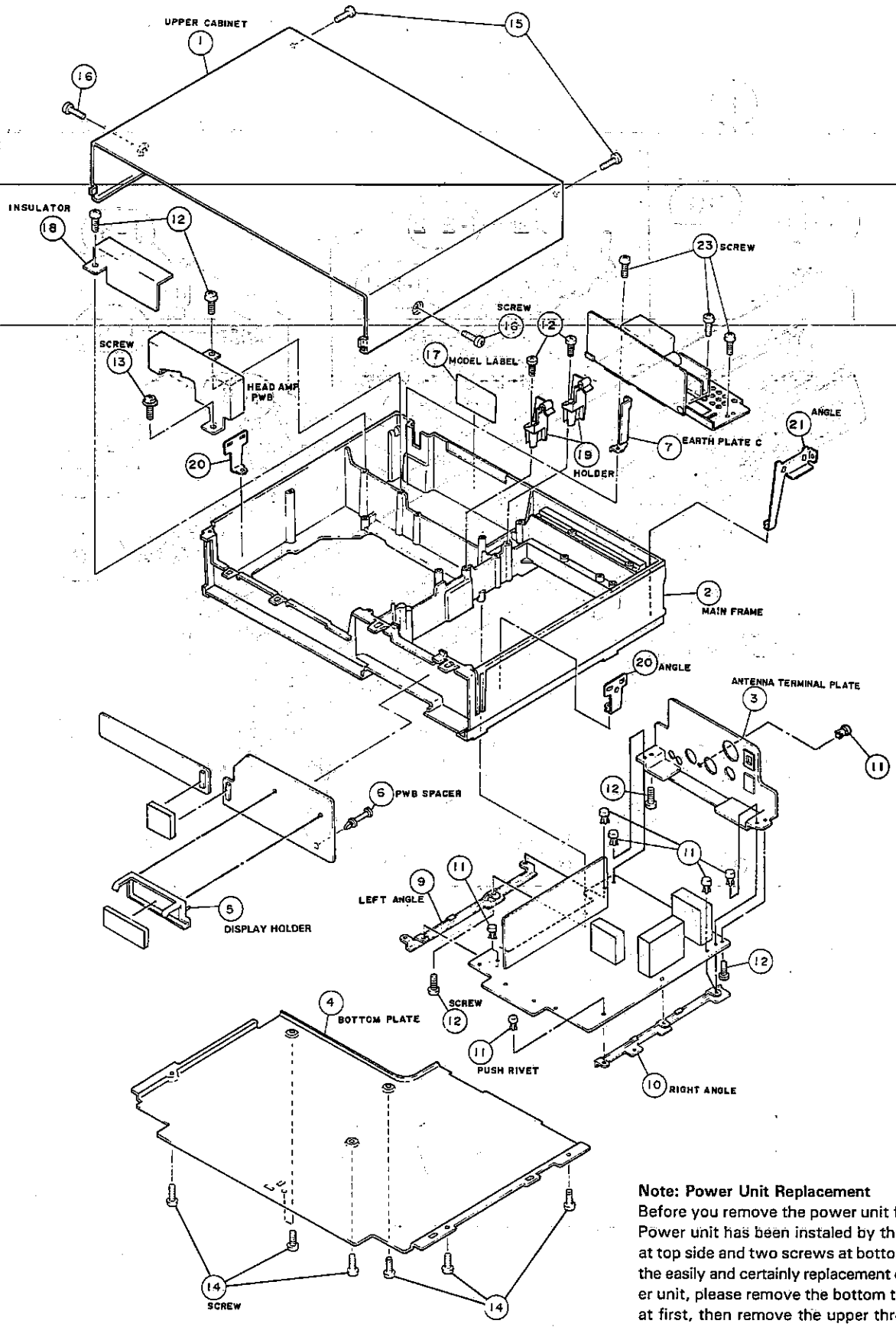
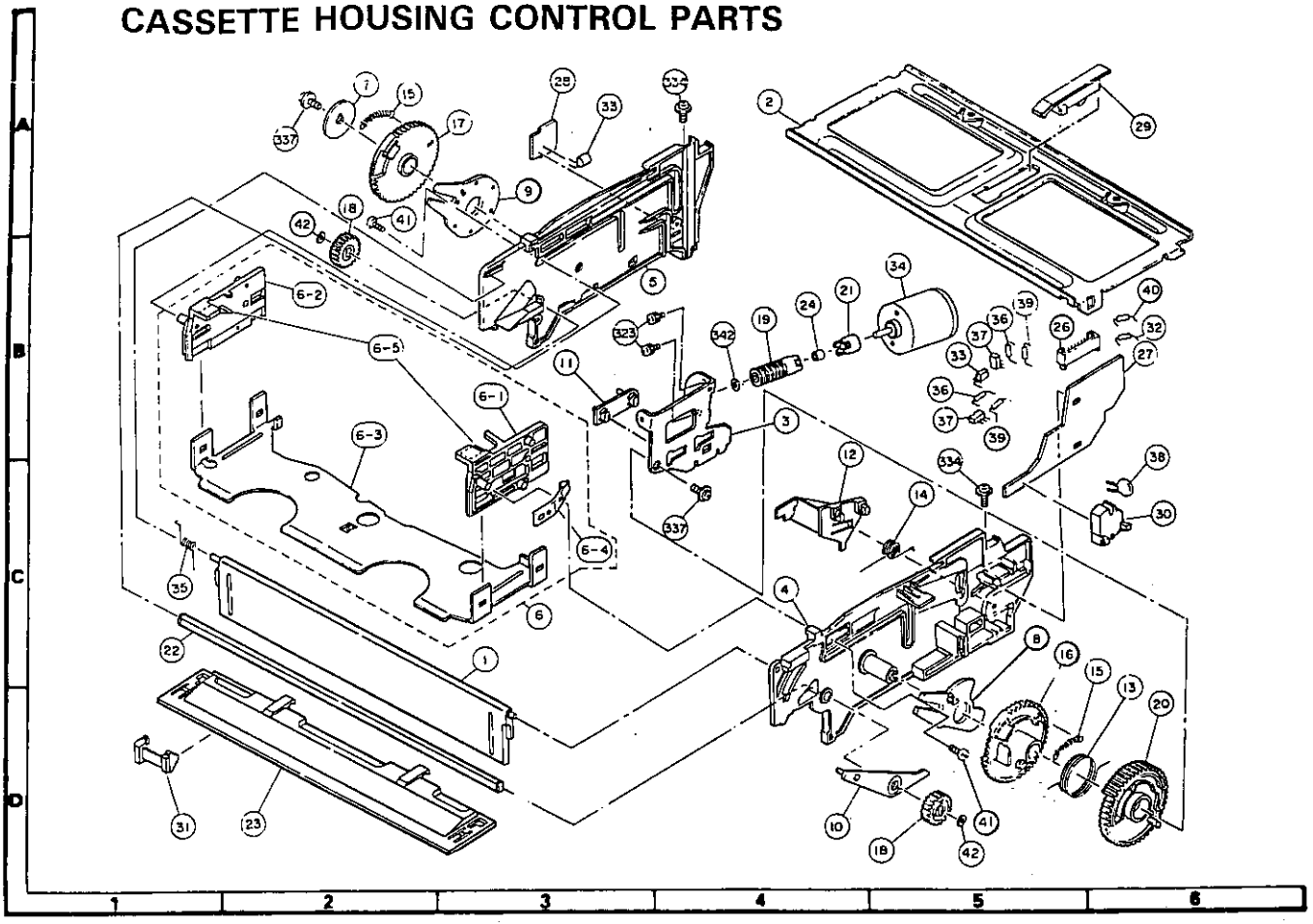
MECHANICAL PARTS



Note: Power Unit Replacement

Before you remove the power unit for service. Power unit has been instaled by three screws at top side and two screws at bottom side. For the easily and certainly replacement of the power unit, please remove the bottom two screws at first, then remove the upper three screws.

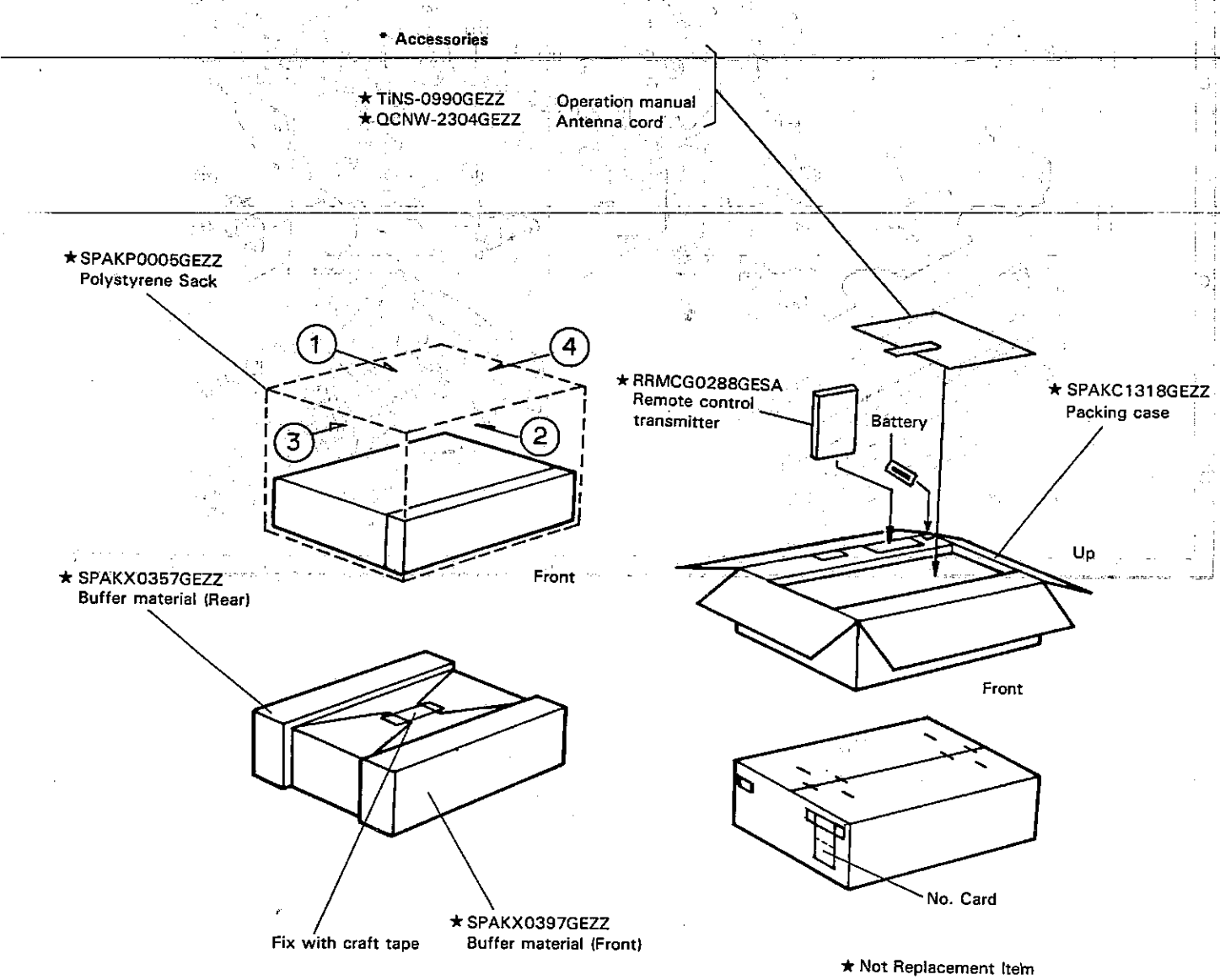
CASSETTE HOUSING CONTROL PARTS



PACKING OF THE SET

• Setting positions of the Knobs

Picture tone knob	Center click	Colour mode switch	COLOUR
Tracking play knob	Center click	Band selector switch	Normal
Tracking still knob	Center click	RF converter switch	3 CH



★ Not Replacement Item

T6128-S
Printed in Japan